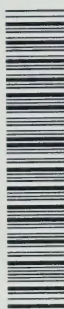


CA20N
EAB
-H26
v. 21



3 1761 11652144 4



Ontario

ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: XXI

DATE: Thursday, June 30th, 1988

BEFORE: M.I. JEFFERY, Q.C., Chairman
E. MARTEL, Member
A. KOVEN, Member



FOR HEARING UPDATES CALL (TOLL-FREE): 1-800-387-8810

EARR
ASSOCIATES &
REPORTING INC.

(416) 482-3277

2300 Yonge St., Suite 709, Toronto, Canada M4P 1E4

CA20N
EAB
-H26
v. 21



ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: XXI

DATE: Thursday, June 30th, 1988

BEFORE:
M.I. JEFFERY, Q.C., Chairman
E. MARTEL, Member
A. KOVEN, Member



FOR HEARING UPDATES CALL (TOLL-FREE): 1-800-387-8810

EARR &
ASSOCIATES
REPORTING INC.

(416) 482-3277

2300 Yonge St., Suite 709, Toronto, Canada M4P 1E4

HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental
Assessment for Timber Management on Crown
Lands in Ontario;

- and -

IN THE MATTER of an Order-in-Council
(O.C. 2449/87) authorizing the
Environmental Assessment Board to
administer a funding program, in
connection with the environmental
assessment hearing with respect to the
Timber Management Class
Environmental Assessment, and to
distribute funds to qualified
participants.

Hearing held at the Ramada Prince Arthur
Hotel, 17 North Cumberland St., Thunder
Bay, Ontario, on Thursday, June 30th, 1988,
commencing at 8:30 a.m.

VOLUME XXI

BEFORE:

MR. MICHAEL I. JEFFERY, Q.C.	Chairman
MR. ELIE MARTEL	Member
MRS. ANNE KOVEN	Member



Digitized by the Internet Archive
in 2023 with funding from
University of Toronto

<https://archive.org/details/31761116521444>

A P P E A R A N C E S

MR. V. FREIDIN, Q.C.)	MINISTRY OF NATURAL
MS. C. BLASTORAH)	RESOURCES
MS. K. MURPHY)	
MR. B. CAMPBELL)	MINISTRY OF ENVIRONMENT
MS. J. SEABORN)	
MR. R. TUER, Q.C.)	ONTARIO FOREST INDUSTRY
MR. R. COSMAN)	ASSOCIATION and ONTARIO
MS. E. CRONK)	LUMBER MANUFACTURERS'
MR. P.R. CASSIDY)	ASSOCIATION
MR. J. WILLIAMS, Q.C.	ONTARIO FEDERATION OF
	ANGLERS & HUNTERS
MR. D. HUNTER	NISHNAWBE-ASKI NATION
	and WINDIGO TRIBAL COUNCIL
MR. J.F. CASTRILLI)	
MS. M. SWENARCHUK)	FORESTS FOR TOMORROW
MR. R. LINDGREN)	
MR. P. SANFORD)	KIMBERLY-CLARK OF CANADA
MS. L. NICHOLLS)	LIMITED and SPRUCE FALLS
MR. D. WOOD)	POWER & PAPER COMPANY
MR. D. MacDONALD	ONTARIO FEDERATION OF
	LABOUR
MR. R. COTTON	BOISE CASCADE OF CANADA
	LTD.
MR. Y. GERVAIS)	ONTARIO TRAPPERS
MR. R. BARNES)	ASSOCIATION
MR. R. EDWARDS)	NORTHERN ONTARIO TOURIST
MR. B. McKERCHER)	OUTFITTERS ASSOCIATION
MR. L. GREENSPOON)	NORTHWATCH
MS. B. LLOYD)	

APPEARANCES: (Cont'd)

MR. J.W. ERICKSON, Q.C.)	RED LAKE-EAR FALLS JOINT
MR. B. BABCOCK)	MUNICIPAL COMMITTEE
MR. D. SCOTT)	NORTHWESTERN ONTARIO
MR. J.S. TAYLOR)	ASSOCIATED CHAMBERS OF COMMERCE
MR. J.W. HARBELL)	GREAT LAKES FOREST
MR. S.M. MAKUCH)	PRODUCTS
MR. J. EBBS	ONTARIO PROFESSIONAL FORESTERS ASSOCIATION
MR. D. KING	VENTURE TOURISM ASSOCIATION OF ONTARIO
MR. D. COLBORNE	GRAND COUNCIL TREATY #3
MR. R. REILLY	ONTARIO METIS & ABORIGINAL ASSOCIATION
MR. H. GRAHAM	CANADIAN INSTITUTE OF FORESTRY (CENTRAL ONTARIO SECTION)
MR. G.J. KINLIN	DEPARTMENT OF JUSTICE
MR. S.J. STEPINAC	MINISTRY OF NORTHERN DEVELOPMENT & MINES
MR. M. COATES	ONTARIO FORESTRY ASSOCIATION
MR. P. ODORIZZI	BEARDMORE-LAKE NIPIGON WATCHDOG SOCIETY
MR. R.L. AXFORD	CANADIAN ASSOCIATION OF SINGLE INDUSTRY TOWNS
MR. M.O. EDWARDS	FORT FRANCES CHAMBER OF COMMERCE
MR. P.D. McCUTCHEON	GEORGE NIXON

(iii)

APPEARANCES: (Cont'd)

MR. C. BRUNETTA

NORTHWESTERN ONTARIO
TOURISM ASSOCIATION

(v)

I N D E X O F P R O C E E D I N G S

<u>Witness:</u>	<u>Page No.</u>
<u>JOHN EDWARD OSBORN,</u> <u>KENNETH A. ARMSON, Resumed</u>	3617
Continued Direct Examination by Mr. Freidin	3617

I N D E X O F E X H I B I T S

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
94	Hand-drawn diagram illustrating systematic cruise.	3630
95	Hand-drawn sketch by Dr. Osborn showing dendrometer.	3640
96	Hand-drawn chart entitled: Tree Volume Table.	3643
97	Hand-drawn diagram depicting equation of co-efficient of variation.	3655
98	Ontario Data Estimate.	3655
99	Hand-drawn diagram depicting equation factors to achieve plus or minus five per cent error.	3659
100	Hand-drawn diagram depicting sample per cent for plus or minus five per cent, N equals 256.	3661
101	Hand-drawn diagram depicting error of plus or minus 10 per cent.	3665
102	Computerized Forest Stand Map.	3731

1 ---Upon commencing at 8:35 a.m.

2 THE CHAIRMAN: Thank you. Good morning.

3 Ladies and gentlemen, just before we
4 start, on Mr. Mander's table over there are some copies
5 of the few letters that the Board has received with
6 respect to suggestions for the Board's site visit. If
7 any counsel want to take a look at what others have
8 suggested, if they have not already got those letters
9 or copies thereof, they can do so at the breaks.

10 The Board will be meeting over the lunch
11 hour to try and ascertain at least, if not specific
12 locations, the types of things that they want to see on
13 this first site visit and we will be advising the
14 Ministry this afternoon before we depart as to what
15 those activities or in some cases locations are, so
16 that they can commence with the planning of the visit.

17 If there are any other submissions that
18 come in later today, we will deal with any additions or
19 exclusions or inclusions on Monday, so that you will
20 then have at least the basis for preparing an
21 appropriate itinerary.

22 Now, it looks like, from what we have got
23 to date, that only three or four representatives of
24 parties will be accompanying us, in addition to the
25 three of us and a guide and a pilot in the first

1 helicopter. So it may well be we will only require a
2 medium-sized helicopter for the second helicopter.

3 It does appear that a member of the media
4 will be accompanying the Board for at least part of the
5 site visit and that I suppose is, to some extent, due
6 to the availability of the media and what else is going
7 on from a news standpoint at that time.

8 But that is the way the site visit plans
9 are shaping up and I thought I would advise counsel
10 this morning of the Board's plans.

11 MR. FREIDIN: In relation to those
12 comments, Mr. Kennedy has been involved in preparing
13 the Ministry's submission and if you look at the ones
14 that have come in, the Ministry's one is not there yet.

15 Mr. Kennedy advises me that he needs
16 another hour to finish off doing up some maps or things
17 that he thought would assist the Board in understanding
18 the Ministry's proposal.

19 I am just wondering, rather than breaking
20 at the lunch and the Board going away if, in fact, we
21 could take the break somewhere during the day that's
22 convenient to the Board but, you know, allow Mr.
23 Kennedy that hour to do that finishing work.

24 I would just ask him to go away and do
25 it, but he is the support person on this particular

1 panel and I would like him to be here.

2 THE CHAIRMAN: Okay. That's fine, Mr.
3 Freidin. What we are trying to do if we can is give
4 you some guidance. So I do not know how quickly you
5 want to be starting your preparations, but we thought
6 you might be able to utilize the three days in starting
7 your plans.

8 If that is not a consideration, then as
9 long as we get Mr. Kennedy's proposal by the end of the
10 day we can come back Monday with our indications, if
11 that is more acceptable.

12 MR. TUER: You will have my proposal
13 later this morning, Mr. Chairman.

14 THE CHAIRMAN: Thank you, Mr. Tuer.

15 MR. FREIDIN: Mr. Kennedy advises that in
16 relation to the logistics, a decision first thing
17 Monday morning would be all right and he also indicated
18 that the Ministry's submission may be lengthy enough
19 that you may want to take more than just the hour over
20 the luncheon break.

21 So if in fact you would reserve your
22 decision until Monday, then there is no problem with us
23 getting an hour.

24 THE CHAIRMAN: Perhaps we will do it that
25 way. We will have Mr. Tuer's submission later today,

1 your submission later today and, frankly, we will have
2 any others that may come in, today being the deadline
3 that we set for those submissions, and then we will
4 come back on Monday and some time during that day make
5 the decision as to where we will go.

6 Very well.

7 JOHN EDWARD OSBORN,
8 KENNETH A. ARMSON, Resumed

9 CONTINUED DIRECT EXAMINATION BY MR. FREIDIN:

10 Q. Dr. Osborn, when we left off
11 yesterday you had indicated why you were going to
12 review or explain how operational cruises are done and
13 perhaps you could start off on that particular venture.

14 DR. OSBORN: A. The question was posed
15 as to where and under what circumstances would
16 additional information be required as a supplement to
17 the forest resources inventory, and we listed a series
18 of possibilities of where and why and how this could be
19 down and amongst that list was the suggestion that
20 operational cruising, in a formal sense, could be one
21 of the ways in which that additional information could
22 be collected.

23 And at the end of yesterday the inference
24 was made that as we describe this a process and there
25 was a statement as to what the bottom line was going to

1 come out of this was because the explanation will take
2 some time, so to give the Board some understanding as
3 to what I am trying to demonstrate as I go through this
4 process.

5 Q. Perhaps you could just indicate then
6 what is the first step when you decided that an
7 operational cruise is the type of supplementary
8 information that you want?

9 A. All right. The first consideration
10 is to, in in statistical terms, define the population.

11 Q. And what do you mean by population,
12 Dr. Osborn?

13 A. We have to decide, for example, which
14 stand or which stands we are going to look at to
15 collect this additional information. We have to define
16 which particular parts of those stands may be of
17 interest to us.

18 So, what is it that we are trying to
19 measure. And the typical example, the most common
20 example would be: We are trying to work out what
21 volume there may well be on 5, 10, 15 or a series of
22 stands.

23 Now, just to exemplify that for a moment,
24 if we consider Exhibit 85 which was in a single forest
25 stand map for a part of the Red Lake management unit,

1 the population of interest could be all the stands in
2 this map sheet that are jack pine. That is an example
3 of a population we might be considering evaluating or,
4 more realistically, all the stands of jack pine in this
5 map sheet that are rotation age and older.

6 Therefore, the choice of population, the
7 definition of population have to be clearly stated so
8 the person doing it - who was doing the working the
9 planning and the analysis - knows exactly to what area
10 physically and what group of blocks of trees we are
11 alluding to, we are referring to.

12 So that is the first step.

13 The second is having decided where and
14 what we are going to look at, what will be the sampling
15 unit that we select.

16 Q. And what's that, Dr. Osborn?

17 A. The easiest answer would be to say:
18 What plots are we going to choose, what size of plot,
19 what shape of plot, because if we are going to measure
20 volume, which is one of several possibilities, but
21 staying with the idea of measuring volume, we are going
22 to not measure the volume of all the trees, we are
23 going to take a sample in operational cruising and we
24 need to decide what the unit is, what block of land we
25 are going to measure these trees on.

1 And we will take several of these blocks
2 of land which are called sampling units. When we
3 talked about the FRI field procedure, we talked of
4 having a station with a prism counting the trees and we
5 described that that could have been done with a plot of
6 land or fixed radius around that centre.

7 Now, that's a plot. It could have been
8 five metres in radius, 10 metres in radius, it could
9 have been square. Those plots constitute the sampling
10 units, the areas we actually go and measure the samples
11 upon. We need to know what shape, what size.

12 Q. And, Dr. Osborn, when you set out a
13 plot like that, when you go to the plot of a given size
14 and you take a sample there, does that involve looking
15 at each and every tree within the geographical area of
16 that plot?

17 A. If we were talking of the volume of
18 all the trees, the answer would be yes and we would
19 come back to what was the population we were looking
20 for.

21 If we were looking for the population of
22 jack pine stands on Exhibit 85 as previously described,
23 we may have only decided to look at the jack pine trees
24 in those jack pine stands. So the definition of the
25 population in the first question is rather key to

1 answer the question that's just been posed.

2 If you are going to look at all trees,
3 yes, we would sample all the trees.

4 Q. All the trees in the plots?

5 A. In the plots. If we were only
6 looking at the population of the jack pine trees, we
7 would only measure the jack pine trees.

8 Q. Again, in the plots?

9 A. In the plots.

10 Q. Well, having determined what your
11 population is and having determined what your sampling
12 unit is, what comes next?

13 A. The next decision is to decide on
14 exactly what unit of that population, what measure of
15 that population is of interest to us. And to translate
16 that into what practically does that mean, we could -
17 and usually would, as just described - go and measure
18 volume of the trees. It doesn't have to be volume. We
19 could, if we were interested, measure the weight,
20 biomass, of the trees. We could, if we were
21 interested, be measuring or estimating the grade or the
22 quality of the trees. So the unit of interest, the
23 measure of interest has to be specified.

24 Now, typically in the examples in
25 Ontario's operational cruise we are concerned with

1 volume.

2 Q. Now, Dr. Osborn, if you have gone out
3 there and you are actually out there in the field is
4 there any reason why you wouldn't measure everything?

5 A. Yes, and we come back in a way as to
6 what we are out there for, let's make sure we know why
7 we are out there. Hence, that first necessity to
8 define exactly why we are out there.

9 If going out there was to measure
10 everything, that becomes the objective and we have a
11 set of objectives, we are not only out there to measure
12 the volume, but the weight of the trees, the quality of
13 the trees, the amount in proportion of the lesser
14 vegetation and, as you can think, the operational
15 cruise may have more than one objective, and in which
16 case you have to be very careful how you define your
17 population.

18 So one has to be somewhat careful that
19 you don't send people out there and say let's measure
20 what's on the plots without being more specific as
21 exactly what it is they are after.

22 Having ascertained why we are out there
23 and what we are looking for, the next decision - and
24 this is all taking place in the thinking step up front
25 in the office at this point in time - what is the

1 acceptable error. How accurate do we want our estimate
2 to be. Because this is a sample, operational cruise is
3 not a one hundred per cent measure of what is there,
4 and with any estimate, with any sample, the calculation
5 procedure will end up with a plus or minus value and it
6 is a managerial decision as to what acceptable error
7 level you want to look for.

8 And we will back at the end of this
9 particular section about that and explain the
10 implications about that decision.

11 Q. Dr. Osborn, you refer to a plus or
12 minus value. Plus or minus value in relation to what?

13 A. If we were looking at the volume of
14 the jack pine trees in the jack pine stand in that
15 particular unit, we will come back from that
16 operational cruise with: They are on average 10,000
17 cubic metres of jack pine trees in the jack pine stands
18 on that map sheet. The estimate will be 10,000 from
19 all the values we have taken and extrapolated to the
20 whole.

21 For the 10,000, we will come back with
22 there are 10,000 out there plus or minus 1,000; 10,000
23 plus or minus 500, 10,000 plus or minus 2,000, because
24 it is a sample, because we haven't tallied everything.

25 And if we were to go back out there the

1 ensuing day and remeasure a different sample, a
2 different set of samples in that same location we would
3 not come back with exactly the same answer. There will
4 be a variation between our estimates of the total on
5 day one and day two and day three and day four.

6 We could go back out there four times and
7 five times and six times and every single time we will
8 come back with a different approximation based upon the
9 samples taken of what was out there in total in the
10 population.

11 MRS. KOVEN: But you have done measures
12 of validity and reliability in terms of a method and
13 that must find its place in the objectives of the OPC?

14 DR. OSBORN: Yes.

15 MRS. KOVEN: Separate from doing the same
16 task again or separate from going -- or for some other
17 reason to look at it?

18 DR. OSBORN: Very much so. Statistical
19 mathematics will let us, from taking one sample,
20 estimate how precise we were, what is the actual plus
21 or minus value. And later on in here I will give you
22 some values that typically in Ontario exist to indicate
23 what does that mean in how many samples we should take
24 to be within certain plus or minus limits.

25 So statistical theory let's you take one

1 sample and from that one sample work out some values
2 that said: I have been out there and I found 10,000
3 and because of what I have done and how I have done it,
4 it is 10,000 plus or minus 500.

5 So, yes, the mathematics lets you do that
6 with going only once rather than five times, but you
7 still - every time you go there, you are still going to
8 end up with something that is plus or minus. So before
9 you go there you have to decide how precise do you want
10 to be. It all comes back to the objective.

11 If you are looking for something that is
12 in a tight supply or in a specialized product, you may
13 want to be plus or minus two per cent and, as you will
14 see later, you will pay to find that.

15 If you can afford to be plus or minus 10
16 per cent, that will be far fewer plots, far smaller
17 sample and a far cheaper operation, so there is a
18 tradeoff.

19 MR. FREIDIN: Q. And later in our
20 evidence will you be giving examples as to when you may
21 want to be plus or minus two and when you may want to
22 be plus or minus ten?

23 DR. OSBORN: A. Yes, the applicability
24 of how you make that decision will be spoken to later.
25 You have to make a decision up front as to what error

1 you are prepared to accept because the next step --

2 Q. Before you go into the next step,
3 just so at least I am clear on this, is there any
4 standard - when you are doing an OPC, is there any
5 standard as to an acceptable error?

6 A. There is no across-the-board standard
7 that says in doing any form of cruise I must be within
8 plus or minus 5 per cent. The choice of what that
9 value should be will depend managerially on the local
10 circumstances.

11 If I have got a tight wood supply and if
12 looking for special product it may behoove me to be
13 plus or minus 1 per cent. I have got a situation where
14 I cannot afford a large error.

15 If I am working in an operation where the
16 good supply currently from the area is large in
17 relation to the apparent demands on the resource, I can
18 afford to have an error that's plus or minus 10 per
19 cent because the magnitude of that error is not going
20 to seriously affect the wood supply for the apparent
21 demands being placed on the resource.

22 So this is a managerial decision. All
23 right. I am trying to think of analogy in real life
24 where it really behooves one to know exactly how many
25 people there are in a town versus when an estimate will

1 do.

2 Do I need to know exactly how many males
3 there are in a town to assess what the school program
4 is, or can I afford to have an estimate. So there is a
5 common sense application in real life here that the
6 manager has to translate into: In my area, for my
7 objective, do I want to be precise or less precise.
8 And it has to be ascertained and it is a managerial
9 decision up front, because of what the implications are
10 in the first step.

11 THE CHAIRMAN: But you cannot be precise
12 in any case to the extent of being absolutely right.

13 DR. OSBORN: No, sir.

14 THE CHAIRMAN: So it always involves an
15 estimate.

16 DR. OSBORN: Yes. As you asked
17 yesterday and without measuring everything, and even
18 that is fraught with an error, okay.

19 MR. FREIDIN: Q. All right. Now, I come
20 to the point where you have indicated your unit of
21 interest and defined for yourself what is an acceptable
22 error. Is that when you then go out and have to select
23 a sample, how many sampling units or lots you are going
24 to have?

25 A. Not quite. We haven't got quite to

1 determining how many we are going to go find yet and,
2 having got the error decided, we need population
3 decided, we need to also decide which of the variety --
4 and there is a variety of sampling schemes, methods we
5 would apply.

6 For example, we could take a subjective
7 sample and, as the word implies, we could go out or we
8 could look before we go out at the photographs and all
9 the map sheets and choose which locations, which
10 stands, which places in the stand we will go and look.
11 And it is a subjective sample that is taken in the FRI.
12 Quite deliberately we go and look for stands we think
13 that are representative of the conditions, a subjective
14 sample.

15 THE CHAIRMAN: Like the type we are
16 going to do in our site visit?

17 DR. OSBORN: I might analyze it
18 afterwards, sir, to decide whether it was random or
19 whether it was subjective, okay. From the inferences
20 you made earlier yes, sir, it was subjective.

21 THE CHAIRMAN: All right.

22 DR. OSBORN: As opposed to, to take that
23 one step further, a random sample. Now, what do I mean
24 by a random sample.

25 We come back to the thought of on Exhibit

1 85 the forest stand map, or a particular map sheet in
2 Red Lake. The population could have been all the jack
3 pine stands on that map sheet, of which there may be
4 20, 30, 40, 50, I don't know. We could have given each
5 stand a number, in fact it has a number, and we could
6 have put those numbers in a hat - and we will work out
7 in a moment how many we draw out of the hat - and we
8 pick at random out of the hat. This is random
9 sampling, somewhat a familiar concept.

10 Difficult to apply in forestry. We could
11 do exactly what I just described, number all the
12 stands, pick the numbers out at random and we will find
13 some of the stands easy to find, easy to locate, easy
14 to get to and some will be far away.

15 So a random sample has some statistical
16 desires, but it has some practical difficulties. But
17 random sampling is possible, random sampling can be
18 practiced and, in some cases, is practiced. That is
19 the second of our list of possibilities and I am not
20 going to go through all of them, but let me lead into
21 the third one which is the one that foresters usually
22 use when, in essence, they do operational cruise.

23 And the third method of sampling is
24 called systematic. In a systematic sample, given our
25 population was the three stands outlined in black on

1 this document, given that was our population, and given
2 at this point in time we still don't know exactly how
3 many plots to take - and in the systematic sample, as
4 the name implies, we are going to systematically cover
5 the area with some form of grid.

6 Now, the practicalities of this are
7 immediately apparent. Having ascertained we can find
8 where we start, it is not too difficult to send the
9 cruise party out on a relatively regular fashion to
10 cover the area, a systematic type of grid. Commonly
11 practiced, not only in operation, cruising, but in
12 other forms of sampling.

13 So at discreet intervals we will take, or
14 place the plots and the number of which is still yet to
15 be determined.

16 MR. FREIDIN: Q. And, Dr. Osborn, on the
17 diagram that you are just drawing the locations of the
18 plots are indicated by little red circles; is that
19 correct?

20 A. Yes.

21 Q. And the layout of the grid, you have
22 laid that out with red lines; is that correct?

23 A. Correct.

24 THE CHAIRMAN: Exhibit 94.

25 ---EXHIBIT NO. 94: Hand-drawn diagram illustrating

1 systematic cruise.

2 MR. FREIDIN: Q. And the areas drawn
3 with the black pen, I assume, indicate stands?

4 DR. OSBORN: A. Stand boundary equals
5 population.

6 MRS. KOVEN: Is the OPC, the system, not
7 constrained in the same way as ground sampling by the
8 accessibility of the plots or stands?

9 DR. OSBORN: Yes. But coming back to the
10 operational cruise is usually done to get supplemental
11 information for those areas where there is going to be
12 some activity in the next 1, 2, 3, 4, 5 years.

13 We will not do OPC -- if you remember in
14 yesterday -- yesterday we described the entire
15 management unit and we talked about supplemental
16 information for a subset of the total.

17 Here, for the next five years, we are
18 planning some operations, not across the entire
19 management unit, and in that subset area, it's smaller,
20 typically we were thinking of a cutting operation
21 either actual and/or planned access is already given to
22 this location.

23 So we don't have the dilemma in the entire
24 unit the FRI has of: How easy is it to access the
25 entire area, we now have a discreet area. It is not

1 usually this nicely clumped in a corner, a discreet
2 area but usually by this time there is some degree of
3 access to that. It is still a problem, yes, but less
4 so.

5 So we can relatively easily and, in an
6 operational cruise this still may be flying, we can't
7 find the start, and then we will go through the
8 population through the forest.

9 So the systematic is a layout on a grid
10 basis and I won't mark this, but you could imagine, I
11 could have divided the whole population into little
12 cells, all the size of my plot and randomly selected
13 which of those cells, plots would come off the total.

14 So you can imagine how random could have
15 come from completely randomly selecting plot 7, plot
16 29, plot 44 on some grid basis. A systematic frame is
17 similar, except now our plots are chosen that it is
18 relatively easy to track -- to go from one to the
19 second to the third to the fourth in a pragmatic
20 fashion.

21 THE CHAIRMAN: Dr. Osborn, why would
22 access be a problem for a small number of people, say
23 two or three - I do not know how many would do these
24 operational cruises.

25 DR. OSBORN: A crew of two usually, sir.

1 THE CHAIRMAN: Okay. A crew of two to go
2 almost anywhere by flying in by, say, helicopter
3 landing somewhere and just trekking over land to where
4 you want to actually do the sample?

5 I mean, what is the major problem with
6 access?

7 DR. OSBORN: It is not a major problem,
8 sir. What you just described is exactly what could or
9 does take place. In fact, because as Mrs. Koven has
10 asked, these areas are already accessed you may well be
11 driving. It merely is that that takes time, takes
12 money and the step that you went beyond was: Having
13 got to the location, then the access to the start point
14 of the sample - I almost reserve judgment until you
15 come back from your field trip, sir, and depending
16 where you go as to how easy you find and without -- in
17 all honesty, is this possible? Yes, it is done. It
18 merely is a point to be of concern because it does take
19 time and, therefore, it costs money.

20 And so coming back to Mrs. Koven's
21 question if you put the sample in an area that has a
22 start point from where you put the grid in, somewhere
23 in and some way in, it is going to take time and effort
24 to locate it. And, in fact, a point I will raise later
25 will come back to some difficulties associated with

1 this, not a major point, it is a piece of the story.

2 MR. FREIDIN: Q. On some occasions do
3 the crew that are going out and doing the operational
4 cruise, do they actually go out into the bush and camp
5 out and stay there for lengths of time?

6 DR. OSBORN: A. With operational cruise
7 at the moment within Ontario I am not sure, but I would
8 hazard a guess the answer would be no, in operational
9 cruise. In the FRI this is certainly the case.

10 There are occasions when the FRI
11 locations are such that, in fact, we are out two,
12 three, four, five, days. But the operational cruise,
13 again, for reasons explained typically we are into and
14 looking in an area where there already is some form of
15 access.

16 I am not sure operationally,
17 district-by-district, but I would hazard a guess at
18 most we know we've got a day's event for a part of the
19 story and we are back the next day in the truck and
20 we're in the bush again. Again, in practicality:
21 Where am I in relation to the cost of traipsing to and
22 from.

23 Three methods I have briefly described:
24 Subjective, random, systematic. Depending on the
25 choice of methodology, there is whole set of

1 mathematical procedures to take the error and the
2 population of concern, work that up in a numeric way to
3 ascertain how many plots.

4 For the sake of continuity at the moment
5 I want to leave the actual arithmetic of that until
6 later and to keep the flow going let's ascertain we
7 have gone through this, we have decided we need 25, 50,
8 however many at this point in time.

9 Q. Now, what training is necessary to be
10 able to perform an operational cruise properly?

11 A. Two or three facets are immediately
12 necessary. We have just reached the stage of deciding
13 how many plots and where we are going to take this.
14 Now, the next step is to send the people out to do the
15 work as opposed to...

16 The people have got to be able to
17 literally find where they are going, map and
18 photograph, some knowledge of how to use maps,
19 photographs and compasses, if you like. In a phrase
20 sort of bush knowledge, for which the next is: How do
21 we use the map and the compass and the photograph.

22 If we stay with Exhibit 94 and this
23 systematic grid, so we have now found where we are
24 supposed to be on the ground as was marked on the map
25 or the photograph. Some time that is more of a

1 challenge than you imagine and you try and find a start
2 point that is pretty often on the photograph, some
3 distinctive tree or bush or jog in the road, to start
4 the cruise.

5 And then if we follow the model of a
6 systematic survey as exemplified in 94, we are going to
7 follow through some compass course our distance measure
8 to be where the centres of the plot would be, which is
9 analogous to the procedure we did with the 10 stations
10 in the FRI: We find a compass point, it's already
11 pre-worked out, we follow the compass course, we
12 measure the distance to put in where the plots have
13 been pre-planned.

14 So we need the skills of the compass
15 work. We get to the plot, we then need some
16 silvicultural forest mensuration skills, we need to be
17 able to identify the species. If we stay with our
18 volume-type example. We need to know how to use the
19 various tools and we have talked about and demonstrated
20 the height-measuring instruments and when we are doing
21 an operational cruise for involve we will typically
22 measure diameters - and I talked of diameters at breast
23 height - a diameter tape, how do I use it.

24 As an example, how do I use it, what do I
25 mean? So with the diameter tape, I am going to take

1 the diameter of the tree at breast height. Now, if I
2 am not very careful how I do it, I could put the tape
3 on at an angle or I could be rather clumsy in whether
4 or not I was standing on a log. A whole range of
5 practical pieces that means you are sloppy in how you
6 take these dimensions, take these measurements, you are
7 wasting time and money.

8 So the staff have to have skill in using
9 the instrumentation that goes with the process. So in
10 the actual plots I record, if I stay with the
11 volume-type example, I will record these values. And
12 so the staff have to know how too use the tool, use the
13 trade, be able to tally correctly, and all of that is a
14 necessity, again, before we have actually set foot in
15 the forest.

16 Q. In the example, you were saying that
17 if you stayed with the volume-type example, if you are
18 in the bush, is the way to measure volume with the
19 tape -- is that the only way of doing it, or is there a
20 more direct way of measuring volume?

21 A. Okay. This comes back to what was
22 the objective, what were we looking for. If we were
23 looking for measuring the volumes of the trees, for
24 example, of jack pines in those stands, then you could
25 think: Why don't we measure the volume of the trees.

1 There is a pragmatic problem here.

2 Forgetting the idea of cutting them down,
3 because that is not where we are at, that is going to
4 come a year later after we have made this estimate, how
5 can we measure the volume of the trees standing up.
6 And it is possible, there are instruments that will
7 enable you -- there are instruments that would enable
8 the people doing the cruise to take -- to actually
9 measure with the instruments - and they are called
10 dendrometers - to measure the diameter of the tree and
11 the location of that diameter above the ground.

12 So you could evaluate -- actually it is
13 done through angles, we are talking of like that
14 height-measuring device. It is a combination of
15 estimating the diameter of width in conjunction with
16 the angle that we are looking at up and down the tree.
17 A dendrometer is essentially those two characteristics.
18 So with a dendrometer we can estimate how far from the
19 ground that first measurement is and the dendrometer
20 will enable us to estimate the diameter,

21 So from a remote location with the
22 dendrometer we can estimate the length of the logs as
23 if you were cutting it down, but it is still standing,
24 and at each of the ends of the logs the diameters.

25 So if you cut the tree down, you cut it

1 up into logs and you measure the length of each log and
2 the diameter and work out the volume as if it is a
3 cylinder or paraboloid or whatever other
4 quasi-cylindrical shape logs are supposed to be.

5 You can do the same sort of thing and
6 leave the tree standing with a dendrometer.

7 Q. In the case of the dendrometer it is
8 an estimate?

9 A. In the case of the dendrometer you
10 are measuring the angle to -- yes, you are not actually
11 going and measuring the length of this log. The device
12 is providing you with a measure actually of that as
13 done by an optical instrument. And same as the
14 diameter, you haven't actually gone to a diameter tape
15 60 feet up the tree, you have let the device look in
16 such a way that it looks up this column and because of
17 the angular measurement of the device you are making a
18 projection, an estimate of what diameter do I get 60
19 feet up the tree.

20 So this is possible. It is not done in
21 conventional operational cruising because of the time
22 and the cost of so doing. This is very time-consuming.
23 And personally having done this, this is typically an
24 R&D approach, but the question was: If you are going
25 to measure volume, why don't we actually go and

1 measure -- we're looking for volume, why don't we go
2 and measure volume.

3 Q. Before you go on, what do you mean by
4 R&D approach?

5 A. Research and development. So when
6 research work is done, careful measurements
7 tree-by-tree are required, then we will actually use a
8 dendrometer to make a rather more precise estimate of
9 the volume of individual trees.

10 THE CHAIRMAN: Dr. Osborn, would you mind
11 putting on the drawing the instrument itself which is a
12 dendrometer so it is with that particular sketch and
13 mark it Exhibit 96, please -- sorry, Exhibit 95 I guess
14 we are up to.

15 ---EXHIBIT NO. 95: Hand-drawn sketch by Dr. Osborn
16 showing dendrometer.

17 MR. FREIDIN: Q. If I could just go back
18 for a moment. Dr. Osborn, when you were up here using
19 this post as your tree and you took the tape out, it
20 appeared to me that you were measuring the
21 circumference of the tree.

22 DR. OSBORN: A. Correct, that is what I
23 did measure.

24 Q. How do you get the diameter?

25 A. Ah, if you looked a little closer on

1 the tape - and you couldn't see from where you are -
2 the units, the units on this particular tape are those
3 that measure, approximate the diameter. They are the
4 units that have included the effect of Pi in the
5 calculation to be mathematically precise.

6 They are units that are long -- the one
7 centimetre value on the tape has taken the
8 circumferential value with Pi to equate to what the
9 diameter value would be. So the tape is graduated, not
10 in one-centimetre measurements in a linear sense, but
11 in a circumferential sense presupposing the object is
12 circular, which is another possible source of error.

13 If I apply a diameter tape to a tree that
14 is not perfectly cylindrical but is very, very oval in
15 cross-section, this is not a precise measure of the
16 diameter. But then, again, if I cut the tree down and
17 tried to measure the diameter of an elliptically shaped
18 tree, what is the diameter.

19 We have a good example right there of a
20 measurement source of error when we are trying to
21 estimate volume as if it is a perfect cylinder.

22 Q. Once you have eventually done those
23 measurements, what is the next step?

24 A. We were talking of we are looking for
25 volume, we measured volume. No, we don't do that, we

1 are looking for volume but we don't actually go and do
2 the sort of device I talked about with a dendrometer.
3 In fact, what do we do, is we will use a
4 height-measuring instrument like the clinometer that
5 was shown before. So we will estimate.

6 If we come back to Exhibit 95, we will
7 estimate with a different kind, a clinometer, a
8 height-measuring device - there is a range of technical
9 names, it doesn't matter - a height-measuring device to
10 have a measurement of the height of the tree. We will
11 also measure with the diameter tape the diameter at
12 breast height only and they are the two values in
13 measuring volume in an operational cruise that are
14 selected.

15 That is certainly the case in Ontario,
16 with one comment. If the objective was to ascertain
17 how many trees we had out there that were going to go
18 through the example described yesterday of a veneer
19 mill and, in a veneer mill we were looking for a
20 product that had no branches or no defect we may, in
21 that case, have the tally people make sure they marked
22 which trees had defect and which didn't.

23 So, again, measuring volume, height and
24 diameter we come back and make sure you know what you
25 really wanted because when the crew comes back, if you

1 can't separate which were the trees with or without
2 defect and then you remember that really I wanted it
3 for this purpose, you have got a source of error and
4 now you have got to decide what am I going to do about
5 it.

6 So you have to know really much up front
7 exactly where you are going. Volume, typically, height
8 and diameter of the required trees in the objective.

9 Q. If you have got those measurements,
10 the diameter at breast height and the height and, as
11 you indicated, you are looking for volume, what do you
12 do with those measurements to derive your estimate of
13 volume?

14 A. We then use a tool out a forest
15 mensuration, a drop, we use a table called a tree
16 volume table.

17 THE CHAIRMAN: Mark that Exhibit 96,
18 please.

19 MR. FREIDIN: Exhibit 96 is a hand-drawn
20 chart entitled: Tree Volume Table.

21 ---EXHIBIT NO. 96: Hand-drawn chart entitled: Tree
22 Volume Table.

23 DR. OSBORN: A tree volume table is a
24 table that will typically show, for a range of diameter
25 at breast height values, values that we have measured

1 with that tape, the diameter tape that we just
2 described for different heights.

3 Yes, sir?

4 MR. MARTEL: Did you say four?

5 DR. OSBORN: Ah, f-o-r not f-o-u-r, sir,
6 sorry.

7 MR. MARTEL: Okay.

8 DR. OSBORN: So for a range of diameter
9 classes, a range of diameter values, on this example,
10 20, 25, 30 centimetres, or a range of height classes,
11 which in this case are 20, 30, 40, typically metres,
12 off that table are a set of volumetric values as shown
13 in the body of the table, 10, 14.

14 So the shows that, in this case, a tree
15 of 20 centimetres at DBH and a height value of 30
16 metres, would have a volume of 13 cubic metres. The
17 actual numerics come out of my head - whether they are
18 right, wrong or even logical, I don't know - but the
19 example is the volume table -- the tree volume table
20 shows volume values by diameter and height class.
21 Where did it come from?

22 A whole series of measurements have been
23 taken across the province to produce what are a set of
24 tree volume tables, and so this set of relationships:
25 Diameter, height, volume has been evaluated and worked

1 out and the volume values can be derived in a graphical
2 sense or can be derived in a mathematical sense, it
3 doesn't matter, you end up with either a table or an
4 equation with that relationship.

5 THE CHAIRMAN: Are they species specific?

6 DR. OSBORN: Yes, sir, very much species
7 specific. And very much species specific, if I turn to
8 Exhibit 95, we have measured the height and we've
9 measured the diameter at breast height, but the species
10 will vary in the shape.

11 If you think that the cross-sectional
12 area and the height determines the volume of a
13 cylinder, so if we measure the cross-sectional at the
14 bottom and the height, we have got the volume of a
15 cylinder.

16 But that's not what we have got in the
17 tree. We have some -- both neiloid, paraboloid and
18 conoid type device all wrapped up in a bundle which
19 gives people making volume tables a few nightmares.
20 The shape, the way the tree tapers is species specific.

21 So in answer to your question, the tables
22 will certainly be species specific because the way the
23 tree goes from diameter to breast height up to that tip
24 will vary, the shape.

25 MR. FREIDIN: Q. Just so there is no

1 question. When you are measuring or estimating the
2 volume, is it the volume of the stem of the tree or
3 does it include the branches?

4 What exactly are you -- what part of the
5 tree are you measuring the volume of?

6 DR. OSBORN: A. As exemplified in
7 Exhibit 95, I am measuring the stem of the tree, the
8 stem of the tree from either ground level or some stump
9 height, again, in the specifications of the cruise. I
10 am measuring the stem of the tree, in this case in my
11 example, to the tip but with no connotation, no
12 connection, no measurement of the branches which was
13 the question posed.

14 Q. The only reason I asked you is that
15 the stem in that picture looked a lot like a conifer
16 tree, that's the only reason I asked.

17 A. And to take that one step further, if
18 this was a hardwood tree, poplar and white birch in the
19 boreal it is not so bad, their shape is not unlike
20 this, but as you move into things like the maples there
21 will be more branching, more massive branching in the
22 body of here and the assertion of what height and where
23 do the branches -- where does the main stem stop,
24 becomes a difficulty.

25 We have taken the dimension, we have

1 tallied the dimensions, we have recorded diameters,
2 heights, species, whatever we were asked to do, we
3 bring the values back, and the next step when you have
4 brought the values back comes back in a way to Mrs.
5 Koven's question of: We work up the statistics and you
6 end up with what you are looking for, how much volume
7 is out there in the total area, but you end up with
8 that estimate and some additional paramaters because of
9 the statistics that let's you come back and say: I
10 have got 10,000 cubic metres out there, plus or minus
11 500, 1,000 whatever the value is that the calculations
12 of those samples enable you to ascertain.

13 So there is a piece of mathematics,
14 statistics that goes with this process. When you come
15 back with the answer, how much have I got out there,
16 but you come back with the answer plus some feeling,
17 some knowledge, some degree of confidence as to what
18 that value estimate is.

19 Q. When you say what that value estimate
20 is, what are you referring to?

21 A. We have asked and we decided we
22 wanted to find out the total volume of jack pine in the
23 jack pine stands. So we come back from the sample,
24 heights, diameters, we go into this volume table, we
25 have got the volume of each tree, we know the volume of

1 each tree, we know how many trees on the sample and,
2 for the moment, let's presuppose the number of plots
3 that we took was a one per cent sample of the total
4 area.

5 We didn't look at the whole area, we took
6 samples. And let's presuppose just for the moment that
7 we took one per cent. We come back and on the actual
8 area we measured, we have got 100 cubic metres and we
9 added up the volume of all the trees, the total trees
10 we measured all added up together were 100 cubic
11 metres.

12 So on the area we sampled there is 100
13 cubic metres measured. We take that sample and we say:
14 But that's only one per cent of the area. We will would
15 extrapolate the one per cent as a sample on the total.
16 So our 100 cubic metres are multiplied in that example
17 by 100. The whole background and rationale of
18 sampling, be it forestry, be it any other part of human
19 life, you take a piece of the story and you extrapolate
20 it.

21 The way you do the sample, you do the
22 sample in such a way that, as best you can, what you
23 take is a true sample, a true sample of the whole
24 population out there.

25 Q. And could you describe then the

1 estimate?

2 A. We have come back with some numbers
3 and I am now going to describe a very simple equation
4 of an example that is applied in a random sample, it is
5 in statistical textbooks, and I want to use this
6 example just to try and demonstrate a couple of things
7 without trying to get in any great length and weighty
8 detail about arithmetic and mathematics.

9 So I am taking something that is a random
10 sample which is relatively applicable to systematic,
11 which is what we do - and statisticians argue about
12 this forever - just to walk through as to what are the
13 meaning of some of those numbers we have come back
14 with.

15 The equation that I have written states
16 that: N (big N) is equal to $T(2)$, times CV
17 (2) , divided by $E\%(2)$:

18 So the number of plots, which is N - N is
19 the number of plots - can be evaluated, can be worked
20 out - and this is back in the office before we went -
21 in a simple random sample from a formula that uses T
22 (2) and $CV(2)$ divided by the $E\%(2)$.

23 What are the components of the equation?
24 T for the moment is a constant and we will come back to
25 it, but we will skip it for a moment. CV :

1 Co-efficient of variation, what's that? It is a
2 measure.

3 The co-efficient of variation is one of
4 several statistical measures of, within the room the
5 weight or size or age of every person is different;
6 there is a variation within the population of people in
7 the room, a variation in one particular paramater. In
8 this case we could take age. So within the room people
9 vary in age. Big deal. You could measure the
10 variability in the range of ages in the room by two or
11 three statistical measures, one of which is the
12 co-efficient of variation. It is just a measure of how
13 diverse our population is.

14 So to stay with that idea for a moment,
15 the bigger the co-efficient of variation the more
16 variable the population, the more different the
17 individual pieces are in the room.

18 If we had a class of Grade 10 students in
19 the room, the variability in age would be low. With
20 the population in the room today, the co-efficient of
21 variation of the age would be high. So co-efficient of
22 variation is a, one of a set of estimates describing
23 variability.

24 The other major component in the
25 equation, $E\%$, was our acceptable error that we spent

1 some time with before, the level at which we decided we
2 were prepared to accept our estimate. Did we accept it
3 plus or minus 5 per cent, 10 per cent, and it is the 5
4 or 10 per cent that goes into this equation, the
5 acceptable error.

6 Q. If it is plus or minus 5 per cent -
7 and I apologize if I have asked this before - plus or
8 minus 5 per cent of what?

9 A. Plus or minus 5 per cent of either
10 the average or the total. In the example we were
11 looking for, we were looking for what is the total
12 volume of jack pine in the stand, and the error could
13 be expressed as a percentage of the total. I want to
14 go and measure the total jack pine, but I am prepared
15 to accept the total plus or minus 5 per cent.

16 I could have gone and asked where I want
17 to measure the average jack pine plus or minus 5 per
18 cent, whatever I am looking for - total is the simplest
19 example - I am prepared to accept by taking that number
20 of samples an error that will range -- the value of the
21 estimate I get will range somewhere within plus or
22 minus 5 per cent of what I actually go and measure.

23 Bear with me for a moment. You come to
24 reflect a little bit: What does this equation give us
25 some inferences about, what can we see out of this

1 equation in a degree of logic as it affects the number
2 of samples. The number of samples obviously will
3 become bigger if the values on the top of the line
4 become bigger. The bigger the co-efficient of
5 variation, the more the variability, the more the
6 number of samples I have taken.

7 Forgetting this being a constant, this
8 staying the same, for 5 per cent error this number is
9 getting bigger and bigger and will increase. And this
10 has been said before, the more variability of the
11 forest out there the greater attention you have to pay
12 because of to get a right answer.

13 So if you are out into a piece of the
14 forest that is incredibly variable, there is a very
15 great diverse species composition and you are looking
16 for the volume of it, you may have to take more samples
17 because the co-efficient of variation will be large.
18 And this is inherent with any statistical sample.

19 If I come back to my analogy of the age
20 in the room: If I wanted to measure the average age of
21 the people in this room and I wanted to be right, plus
22 or minus five years, I would probably have to measure
23 most of the people in the room. If we had a class 10
24 in the room, to get a right answer plus or minus one or
25 two years I would have to measure or take a sample that

1 was far smaller.

2 So the co-efficient of variation has a
3 dramatic effect in this equation on the number of
4 samples.

5 What about the error? What implications
6 do I get out of that, without even worrying about the
7 numbers for a moment, just logic.

8 The smaller I make this number, the
9 smaller, instead of accepting a plus or minus 10 per
10 cent I demand plus or minus one per cent. Ten squared,
11 I am dividing by a hundred, one squared I am dividing
12 by one. The smaller I make the acceptable error, the
13 larger will be the number of samples I have to take.

14 If I make the divider small, like one,
15 plus or minus one per cent, this will be large. If I
16 make the divider large like 10 squared, plus or minus
17 10 per cent, it will make the number of samples
18 smaller.

19 So when I go out there I really need an
20 answer that's close to the truth, I need it to be very
21 precise, an error of plus or minus or 1 per cent, I am
22 going to have to take a large number of samples in
23 comparison with if I am prepared to accept plus or
24 minus 10 per cent and. In which case. The number of
25 samples will be smaller. There is a tradeoff.

1 And this is really why the thinking
2 through of what do you want and are you sure you are
3 prepared to accept at that level is key because it has
4 an impact on how many plots do I have to go and
5 measure.

6 So this equation is a simple random
7 sampling determining how many plots is really driven by
8 two conflicting factors. The more variable our forest,
9 the more we have to take plots; the more demanding we
10 are in managerial requirements, the more we have to
11 take plots.

12 So there is a real tradeoff required in
13 thinking about this equation there.

14 Q. Is there a co-efficient of variation
15 for trees in stands within the Province of Ontario?

16 A. Yes, there is. The forest
17 mensurationist in the Ministry of Natural Resources who
18 has been analyzing these sorts of data for some time,
19 has a ballpark gut reaction now, without doing a sort
20 of analysis across the whole province, a gut reaction
21 now of typically in Ontario what sort of values do we
22 get in co-efficient of variation.

23 So I am going to present a number that is
24 an overall global average. Individual areas will be
25 much smaller in co-efficient of variation, certain

1 areas may be much larger in co-efficient of variation,
2 so I am going to present a number - actually two
3 numbers - that typically describe what is the overall
4 average in Ontario to exemplify, just to go through
5 some arithmetic to demonstrate a couple of points,
6 so...

7 THE CHAIRMAN: Dr. Osborn, would you mark
8 that Exhibit 97, please.

9 ---EXHIBIT NO. 97: Hand-drawn diagram depicting
10 equation of co-efficient of
variation.

11 MR. FREIDIN: Perhaps you could mark this
12 document as the next exhibit before you give your
13 evidence.

14 DR. OSBORN: 98.

15 What I would like to do is, therefore,
16 take this overall provincial average estimate for the
17 co-efficient of variation and go through the mechanics
18 of the arithmetic to illustrate some impacts, some
19 effects of changing both the co-efficient of variation
20 and the acceptable error.

21 THE CHAIRMAN: What will you call Exhibit
22 98, that particular equation?

23 DR. OSBORN: Ontario data estimate.

24 ---EXHIBIT NO. 98: Ontario data estimate.

25 DR. OSBORN: So far in this discussion I

1 have jumped over what T is. I am very tempted to
2 continue to jump over what T is.

3 Let me state at the moment it's a
4 constant and at the moment, for the sake of the
5 arithmetic, let me give you that the value is two, T
6 equals two, and I will come back and explain. So at
7 the moment, for the arithmetic, and let's take the
8 value as two.

9 The co-efficient of variation in Ontario
10 typically found is something in the order of 40, if we
11 are talking about volume in cubic metres per hectare on
12 a stand-by-stand basis.

13 So within stands in Ontario, within
14 stands, the variability between the volume of the trees
15 within a stand, the individual tree's volumes vary as
16 worked out with what co-efficient of variation means to
17 a value of 40. If they were less variable, the number
18 would be smaller; if they were more variable, the
19 number would be larger. Cubic metre per hectare
20 variation on a tree basis.

21 And let's assume for the first arithmetic
22 example we take our E per cent of plus or minus five
23 per cent. And if we go through the arithmetic of:

24
$$\frac{2(2) \times 40(2)}{5(2)}$$

25

1 our T squared of four, co-efficient of variation 40
2 squared, coming to 1600, our five squared, our error
3 per cent at five per cent coming to 25, we end up with
4 an arithmetic answer of the number of sample plots is
5 256.

6 What does that mean? If we are looking
7 for volume on average in Ontario, if we are looking for
8 volume at the stand basis, at the stand level,
9 typically in Ontario, going through that calculation
10 procedure, the number of sampling plots is 256.

11 MR. FREIDIN: Q. That is if you want a
12 margin of error of plus or minus five per cent.

13 DR. OSBORN: A. that's correct.

14 MR. MARTEL: Is that for all species?

15 DR. OSBORN: Yes, sir. That is typically
16 as far as I understand from the mensurationist, the
17 co-efficient of variation all species combined in gross
18 total volume on a stand-by-stand basis.

19 So that's the sort of arithmetic one can
20 go through in the office before one goes out, given
21 that one knows what the co-efficient of variation is
22 and the managerial decision on what the error you are
23 prepared to live with.

24 Just to step sideways for a moment.

25 Exhibit 85, if that really was the area you wanted to

1 do the sampling in, you would need to have some
2 estimation of, for that area, what was the co-efficient
3 of variation. And the local manager would have
4 essentially three choices how to find the answer.

5 The first is the calculation done in the
6 office before he goes out, he could assume this was
7 exemplified by the Provincial average. The second is
8 he could have done, or she could have done, or there
9 could have been previous estimates of operational
10 cruise in the same or similar areas and when you have
11 done that cruise you can come back and calculate what
12 that value was.

13 And the third opportunity that exists is
14 to go and do a preliminary: Let's have a quick check
15 in the front edge of the population, almost a
16 mini-subsample to try and determine what the
17 co-efficient of variation is.

18 There is a range of options to try and
19 get an approximation before you seriously do the sample
20 of what that value is. What you need to know is
21 without it, you can't work out how many plots you
22 should take.

23 MR. FREIDIN: Q. Now, Dr. Osborn, what
24 is the typical plot size for doing operational cruises
25 in Ontario?

1 THE CHAIRMAN: Exhibit 99.

2 DR. OSBORN: Thank you, sir. You have
3 the tally sheet.

4 THE CHAIRMAN: The master one anyway.

5 ---EXHIBIT NO. 99: Hand-drawn diagram depicting
6 equation factors to achieve plus
7 or minus five per cent
error.

8 MR. FREIDIN: Q. So could you advise
9 then what is the plot size for -- is there a typical
10 plot size for OPC in Ontario?

11 DR. OSBORN: A. Yes, the typical plot
12 size, it will vary with the age and sizes of the trees.
13 The typical plot size is a tenth of an acre which is
14 approximately .04 of a hectare.

15 Now, so a tenth of an acre is a typical
16 plot size. If we remember, we go out in here and we
17 put in a plot centre, much like the FRI cruise, in a
18 way we have a plot centre and around that plot centre
19 we are going to measure the trees in an area and we
20 will keep it simple at the moment, in an area that is
21 bounded by some artificial boundary whereby the total
22 area of all the trees we are looking at is
23 approximately a tenth of an acre.

24 Q. Now, if you require, as I understand
25 it from the earlier example or exhibit, if you require

1 256 plots per stand to obtain a plus or minus of five
2 per cent reliability or accuracy, what area would you
3 have to measure if you are doing an OPC using the
4 typical plot size?

5 A. In going through the arithmetic, 256
6 plots each plot .11 acres in size - if I state the
7 Imperial for a moment- so the total area that is
8 actually being measured from the sample is 25.6 acres.
9 So the total area on which I count, I measure heights
10 and diameters of all the trees in those 256 plots, if
11 we put them all together, we would end up with actual
12 measurements on 25.6 acres.

13 Q. Do stand sizes vary in Ontario?

14 A. Yes, they vary considerably, and a
15 sort of rapid perusal of Exhibit 85 will indicate that
16 stand size in Ontario is incredibly wide and ranging.

17 Q. Are you able to approximate the
18 average size of stands in the boreal forest?

19 A. Given a couple of hours' computer
20 time on the FRI database in Toronto, I could calculate
21 it for you. But the value approximates - and this
22 again is from discussion and dialogue with local
23 foresters: Typically in your unit, what have you got,
24 what do you think the value is. So typically the value
25 runs around a hundred acres.

1 There are stands that are much larger
2 than that and there are stands that are much smaller
3 than that but, for the sake of this discussion at the
4 moment, I want to use the number of a hundred acres
5 with no statement that this is in any way, shape or
6 form necessarily the average in Ontario. I have not
7 calculated it, so I do not know the exact. It is a
8 hundred acres. But for the sake of this example, it is
9 running in and around that value.

10 Q. You are saying, is it running in and
11 around that value in reality, but you can't be precise?

12 A. As far as I know from discussion and
13 dialogue, that is the general feeling I get back, but
14 given under oath, I am not going to come out and say it
15 is a hundred acres in Ontario.

16 Q. All right. Now, if you measure for
17 plus or minus five per cent on this average size stand
18 and the area that you have to measure is 25.6 acres as
19 indicated, what would your sample percentage be?

20 THE CHAIRMAN: Exhibit No. 100.

21 ---EXHIBIT NO. 100: Hand-drawn diagram depicting
22 sample per cent for plus or minus
 five per cent, N equals 256.

23 THE CHAIRMAN: Ladies and gentlemen, we
24 have reached a milestone, we are up to a hundred.

25 The Board is going to propose that when

1 we reach a thousand, if and when, by the end of this
2 hearing that everybody in this room will be invited to
3 a party to be hosted by that party that submits the one
4 thousandth exhibit.

5 MR. FREIDIN: Could we figure out the
6 probabilities plus or minus of that being the Ministry,
7 seeing as the Ministry gets the price.

8 THE CHAIRMAN: If it is you, you pay.

9 MR. FREIDIN: If it is the last exhibit,
10 I will be happy to.

11 DR. OSBORN: So the exhibit is entitled:
12 The sample per cent for plus or minus five per cent, N
13 equals 256.

14 So for that piece of arithmetic the area
15 measured that came from Exhibit 99 was the 25.6 acres
16 and the entire 25.6 acres from all those plots we have
17 measured the trees. If the average stand size is a
18 hundred acres, the arithmetic shows that the per cent
19 sample is running at approximately, approximately equal
20 to 25 per cent.

21 Now, with that set of calculation, with
22 that co-efficient of variation, with that desired
23 management precision, given the average size of the
24 stand, we are talking of operational cruise, on a stand
25 basis, that necessitates 25 per cent sample.

1 MR. FREIDIN: Q. And could you advise,
2 what is the practical effect of having a sample
3 percentage of that magnitude?

4 DR. OSBORN: A. If I want to translate
5 it, if you like, into almost Australian lay terms, it
6 is measuring every fourth tree.

7 Q. Measuring every fourth tree in what
8 area?

9 A. In the entire area we looked at. So
10 I am going in to my 10 or 15 or all my jack pine stands
11 on that map sheet, if you like in theory, and I am
12 walking through that entire jack pine forest and I am
13 in fact measuring every fourth tree.

14 Q. In the hundred acre stand?

15 A. In the entire population. That is
16 not in the hundred acre stand, that is in the entire
17 population of however - 1, 2, 3, 4, 5 stands - but in
18 that 100 acre stand I am measuring every fourth tree
19 and in the next stand I am measuring every fourth, and
20 in the next stand I am measuring every fourth tree, if
21 I wish to have a volume estimate that is plus or minus
22 five per cent for the individual stand.

23 Q. Now, if you do a typical operational
24 cruise, a typical OPC, can you advise what the sample
25 percentage is?

1 A. In Ontario?

2 Q. Yes.

3 A. Okay. Again from discussion with
4 field foresters and from discussion with the forest
5 mensurationist, the sort of operational cruise
6 percentage taken in Ontario at the present is in the
7 order of two to three per cent. One to two to three
8 per cent. It is in that order, as opposed to the
9 number I have just described.

10 Q. And taking the middle number, two per
11 cent, if you had a two per cent sample, how many trees
12 would that require be measured?

13 A. If I come back to that lay
14 translation, as I walk through my stand I am, in
15 essence, measuring every 50th tree as opposed to every
16 fourth tree.

17 Q. So can one conclude then that with
18 the sample percentage used in the OPC, the accuracy
19 would be -- could you indicate what the accuracy might
20 be in relation to the plus or minus five per cent that
21 you have indicated you would get if you took 256 plots?

22 A. Two per cent sample, taking the same
23 co-efficient of variation, plus or minus acceptable
24 error, is going to be larger. We expect to find if we
25 take that degree of sample an error that is in excess

1 of five per cent level on a stand basis, given the
2 co-efficient of variation of where that stand is
3 brought in.

4 Q. And are you able to indicate how many
5 plots you would need if you wanted to have a plus or
6 minus 10 per cent?

7 ---EXHIBIT NO. 101: Hand-drawn diagram depicting error
8 of plus or minus 10 per cent.

9 THE CHAIRMAN: Before we go into this,
10 Mr. Freidin, can we take a break at this time and then
11 come back to this example? We will break for 20
12 minutes.

13 MR. FREIDIN: 20 minutes.

14 THE CHAIRMAN: Thank you.

15 ---Recess at 10:05: a.m.

16 ---Upon resuming at 10:35 a.m.

17 THE CHAIRMAN: Thank you, ladies and
18 gentlemen. Please be seated.

19 MR. FREIDIN: Q. Dr. Osborn, I believe
20 you were just going to work out a number of plots if
21 you wanted to have or you were willing to accept a 10
22 per cent error.

23 DR. OSBORN: A. If we take the same
24 basic equation in Exhibit 101 that we had before of the
25 calculation of the numberof sample plots, the same

1 basic formula, and we re-insert into the formula the
2 values for T squared of four - the same as before, the
3 constant - and we re-insert into that formula the same
4 co-efficient of variation that was 40, we have stayed
5 with the same top line and all we have changed is let's
6 accept a managerial error of plus or minus 10 per cent
7 in this particular case, and if we go through the
8 arithmetic, the number of sample plots required
9 becomes 64.

10 Q. And in the thousand -- using a
11 hundred acres? Is it a hundred acres we were using in
12 the example - if I am correct - what would the
13 percentage sample be in that case?

14 A. We are measuring 64 plots, each plot
15 is a tenth of an acre, we are measuring 6.4 acres. 6.4
16 acres on our hypothetical hundred acre average stand
17 gives us a per cent sample of 6.4 per cent.

18 Q. Dr. Osborn, if you took the hundred
19 acre stand which you indicated would -- you were using
20 as an average, if you had to take 256 plots to get the
21 5 per cent plus or minus that you indicated in the
22 first example, could you indicate how many trees you
23 will have to go out and measure, both the height and
24 the diameter - assuming you are going after volume
25 information - how many trees would you have to measure

1 in each stand?

2 A. One way of approximating this is if
3 we turn to page 213 in the Exhibit 78, the
4 evidence-in-chief.

5 If we turn to page 213 of the
6 evidence-in-chief and that is a table, a table of jack
7 pine, a yield table, table of jack pine in site class 2
8 and that is just used as an illustration to answer the
9 question. In terms of that table of jack pine site
10 class 2, and we come down until we read a value
11 opposite 80 years, so we come down that table to an age
12 that is typically of sort of mature jack pine, the sort
13 of ages we would be looking at to do this sort of
14 technique and we come down to the line of 80 years and
15 in the fourth column - so we have 80 years at 61.7 feet
16 in height, 7.3 inches in diameter - the fourth column
17 reads trees per acre and the value is 391.

18 So that is the yield table on page 213,
19 jack pine sight class 2, 319 trees per acre, a fully
20 stocked stand. That's what the yield tables are based
21 on.

22 Now, let's presuppose that the stands in
23 Red Lake, for the sake of easy calculations, are not
24 fully stocked so we could imagine there may well be 300
25 trees per acre out there at this point in time, as a

1 round number for the arithmetic.

2 So 300 trees per acre, 300 trees on every
3 acre on average, and we were going to measure in the
4 first example of 256 plots, we worked that out, we were
5 going to measure approximately 25 acres out of a
6 hundred acre stand. So the 25 acres with 300 trees on
7 every acre, we can go through and demonstrate very,
8 very crudely, very simplistically we are looking at
9 maybe 7,000 trees. Three times -- 300 times the
10 300 -- 300 times 25.

11 Again, the point of the example is to
12 illustrate approximately how many trees are we talking
13 about going and measuring heights and diameters on if
14 it we take this number of plots on this typical example
15 sized stand.

16 And the reason for sort of mentioning
17 that number, sort of bearing in mind that means 7,000
18 trees we measure on that kind of plot. When we turn to
19 the second example where we are going to measure 64
20 plots as opposed to 256, we are only going to actually
21 measure trees on 6 acres instead of 25 acres. On 6
22 acres, if there's approximately 300 trees per acre, we
23 are talking of measuring some 1,800 trees as opposed to
24 7,000.

25 Q. And if you are doing a two per cent

1 sample in your hundred acre stand which is the per cent
2 sample that you indicated was the one you used for the
3 OPC, can you indicate how many trees you would have to
4 go out and measure?

5 A. In a two per cent sample on the
6 hundred acre plot that is the equivalent of going and
7 measuring on two acres of the hundred acres. Two acres
8 with 300 trees per acre, we are going and measuring the
9 height and diameter of some 600 trees.

10 Q. Dr. Osborn, are there any conclusions
11 that you can make regarding the OPC process?

12 THE CHAIRMAN: Excuse me. That 600 trees
13 was at the five per cent margin of error level?

14 DR. OSBORN: No, sir. The question was
15 asked: If I take a two per cent sample - which is not
16 far off typically what happens in Ontario - a two per
17 cent sample, how many trees do I measure?

18 So the two per cent sample would be -
19 without worrying about the error for a moment - the two
20 per cent sample is two acres in the hundred acres. Two
21 acres at 300 trees per acre, I have got 600 trees I
22 measure.

23 There was no estimate given of what the
24 error with the two per cent sample would be.

25 THE CHAIRMAN: Okay.

1 MR. FREIDIN: Q. Dr. Osborn, are there
2 any conclusions you can draw regarding the OPC process
3 as a result of your description of it in your evidence
4 in relation to the four matters that you listed at the
5 end of yesterday as sort of the four main bottom lines,
6 if I use that phrase, of this evidence?

7 A. Okay. In that list, in that list of
8 four the first one was the process was complex. And
9 the illustration this morning indicates that you have
10 to think it through carefully, you have to be aware of
11 the approaches being taken, and we have made reference
12 to the design and the definition of population and we
13 have made reference to understanding there is different
14 methodologies of sampling; random, systematic, you need
15 to know and understand which one you are going to use
16 and why.

17 One of the other list of four we had was
18 unique care to ensure it is done correctly. We made
19 some reference to the training of staff, the sort of
20 training one is needed, we need to take the
21 measurements properly.

22 We made reference to the fact that when
23 you do this process the way it has been described it is
24 still a sample and inherently within the sample there
25 is an error associated with the sampling process. One

1 of conclusions was you still end up with an estimate,
2 but with some knowledge of the error associated with
3 that estimate.

4 The last item that we spoke about in that
5 list of conclusions, the last item I was going to lead
6 up to was inherent that some costs are involved with
7 the process and I will spoke to those in a moment.

8 Before I move into those, just some
9 comments about those bottom lines. We dwelt on the
10 need to identify whether we are looking at gross total,
11 gross merchantable, net merchantable. We really have
12 to define that. We have no know in advance exactly
13 what we are going to measure and whether or not we have
14 got tables that speak to, in the case of volume, that
15 range of items. So you have to be careful with that.

16 We spoke to species usage before, let's
17 make sure that we don't measure all the trees if we are
18 only interested in one species. And one other item
19 that I haven't gone into explain is: If I go look for
20 an estimate that is plus or minus 10 per cent all
21 species combined and I do tally and I do keep separate
22 the volume of each and every species I find, and if in
23 the whole hundred per cent looking at the trees I found
24 that 70 per cent was spruce and 30 per cent were jack
25 pine, then the plus or minus ten per cent for the total

1 that I have established will not be plus or minus for
2 the spruce which is only a part of the area or the jack
3 pine which is part of the area.

4 Without explaining the arithmetic of
5 that, the per cent error associated with a subset of
6 the total is larger than the per cent error for the
7 total population. In my analogy earlier about school
8 kids in this room in a Grade 10 class, if I estimate
9 the average age for all the kids, plus or minus ten per
10 cent, I take so many samples.

11 If I take that number of samples, the
12 error associated with the estimate for the girls versus
13 the age of the boys will be larger than my plus or
14 minus 10 per cent for the total. Statistics textbooks
15 can explain much better than I can how you end up with
16 that derivation.

17 So the comment I wish to make is: When
18 you go look for the plus or minus value you are
19 realizing that if you look for a subset of that
20 population, the smaller the subset the more rare the
21 subset the greater awareness you must have that that
22 estimate will be less and less precise.

23 Again, this is a fact of life and it is a
24 real pain as far as foresters are concerned because
25 some of the particular items that we are pursuing may

1 well be not the most frequent. I made an allusion
2 yesterday, a comment yesterday about veneer bolts,
3 veneer logs.

4 And typically we are in a stand and
5 typically it may well be aspen or poplar, typically
6 within that stand the actual number of trees with logs
7 that are suitable for that product aren't all the trees
8 and they are only part of the trees, and yet that is
9 quite a valuable product.

10 So maybe I should make the considerable
11 effort - I should make the effort, it is worth my while
12 practically to go and pursue that relatively smallpart
13 of the total. There is a tradeoff, a management
14 tradeoff that you have to recognize. You need more
15 samples because it was a smaller part of the population
16 but the product is that much more valuable.

17 And, again, a manager can sort of
18 evaluate what is the product worth versus what is the
19 cost of taking the sample. All I have done in the
20 evidence is touch very, very, very superficially on
21 something that requires a lot more serious analysis,
22 much more refined analysis to end up literally with:
23 Virtually how many do I really go and get in this
24 location for this purpose.

25 In the description of this process of

1 operational cruise, one of the four bottom line pieces
2 coming out of the story is a recognition that it was
3 expensive. To date, I haven't presented any evidence
4 at all speaking to the costs.

5 So I would like to return to the evidence
6 on page 33 and in paragraph 61 -- and in paragraph 61
7 there is reference to comments that the operational
8 cruise is typically more costly than the forest
9 resources inventory and there is reference after that
10 paragraph to Document 33 which is given on page 229.

11 On page 229 is a histogram or a bar chart
12 entitled: FRI Work 1983 to 1987. And on page 229,
13 which is the first of a set of five diagrams, all in a
14 series, and five diagrams will show the FRI work, the
15 FRI costs, the operational cruise work the operational
16 cruise costs in comparison and I will go through them
17 one by one.

18 So what we are going to show is literally
19 a comparison between FRI/OPC in a costing sense. And
20 on page 229 we have the first of the series of five
21 illustrating for the last five years the actual area
22 that's been outputted in the FRI process, the actual
23 area of completed FRI produced on an annual basis.

24 When I talked about the FRI and we talked
25 about workload and schedules, we estimated on average

1 it kicks out some 33 to 34,000 square kilometres a
2 year. It is an overall average.

3 Now, from year to year they are much like
4 we have just been through with the trees, there is some
5 variation. And so page 229 shows a final output which
6 is the left-hand of the two columns in each year, the
7 final output, square kilometres of completed FRI. The
8 scale is area in K - or a thousand - square kilometres.
9 The area of completed FRI in 1983 and a column showing
10 the area completed in 1984, a column in '85, a column
11 in '86 and a column in '87, the total area of FRI
12 completed on an annual basis.

13 There also is in there a column showing
14 the area photographed in each of those years and that
15 was done to illustrate two items really: The first is
16 that the total area photographed is usually -- is in
17 fact larger than the area actually completed. The way
18 the photograph contract is done, it will actually cover
19 slightly larger than the area for which you need the
20 data to make sure there are no gaps.

21 So typically the area photographed which
22 is the right-hand of the two bars for any particular
23 year exceeds the area completed. All right, so we have
24 and apparent anomaly in 1985 and all this exemplified in
25 essense is there is a gap in that what is flown in

1 1985, the actual data covered by the photography in
2 '85, in fact is not completed until 1987 because it is
3 a three-year process.

4 So I wanted to use this piece of evidence
5 just to show not only the workload but the fact that
6 there is a time horizon within the FRI statistics that
7 you have to be aware of in any sort of comparisons.

8 MRS. KOVEN: And were the budgets
9 constant or similar through those five years?

10 DR. OSBORN: The next, in fact 239 will
11 answer your question, okay.

12 On 230 -- the diagram on page 230 will
13 illustrate the actual FRI costs, the actual FRI
14 expenditures for that same five-year period.

15 And so to pursue your question of the
16 expenditures, in fact differed year by year and the
17 question that poses I am going to reach in a moment as
18 to: Did the cost per unit area change or vary over time
19 and we will come to that as the last diagram.

20 So the diagram on page 230 the FRI costs
21 for the period 83-87 shown on an annual basis, the
22 total expenditures by MNR for activities classified as
23 FRI activity. And the amounts on an annual basis do
24 vary.

25 This is the expenditures which is perhaps

1 not exactly the same, Mrs. Koven, as you asked: What
2 the budgets were. This is exactly what was spent not
3 necessarily what was asked for: What was originally
4 allocated, but what was actually spent.

5 Now, not knowing exactly what you meant
6 by the word budget this is expenditures.

7 MR. FREIDIN: Q. Dr. Osborn, the slide
8 which you put up has something on it that is not on
9 page 230 and that is the \$1.89 figure at the top of the
10 1983 column, and the other dollar -- or values on top
11 of the other one.

12 What is that?

13 A. Oh, I am sorry. Why are these
14 particular values on the overhead.

15 Q. That's correct.

16 A. And they are not on page 229?

17 Q. Just tell me what they are.

18 A. They are the actual values --
19 actually, what would be on this scale if you come
20 across.

21 So if you come across the top of any of
22 the bars - because it was hard to translate by the time
23 I got out here - what is the actual value I cannot
24 conveniently go all the way across here, we have
25 actually added the numerics on -- I apologize, I had

1 forgotten a change was made to the diagram to make it
2 easier to read.

3 We have actually entered the numerics
4 which is what you would get.

5 Q. For 1983 the FRI expenditures are
6 \$9-million?

7 A. \$9-million, yes, sir.

8 Q. And if you turn...

9 A. And the diagram is across the page.

10 So the FRI workload, the FRI costs, what is the
11 comparable? On page 231 of Exhibit 78, the operational
12 cruise, OPC, work from 83-87; again, the area in
13 thousands of square kilometres.

14 And so just a reminder: On 229 in the
15 FRI we were talking of 30 or 40,000 square kilometres.
16 In operational cruise we are into one to one and a half
17 thousand square kilometres. So the area operationally
18 cruised in any one year is far smaller than the area
19 covered by the forest resource inventory.

20 And we have explained why that is the
21 case, the OPC is only done on a small subset of the
22 entire management unit; the FRI is done on the entire
23 management unit.

24 Q. Are you able to approximate the
25 percentage then of the FRI area inventory which was

1 subjected to OPC in those years?

2 A. No, and it is a misleading statistic
3 if you tried because the areas covered on this
4 particular diagram on page 231 is the areas done in
5 operational cruising in the province on all management
6 units; whereas the area given in FRI in diagram 229 was
7 the area completed for maybe five or six units in that
8 year, not all the units in the province.

9 So the diagram on 231 illustrates the
10 operational cruise work amount, the area in square
11 kilometres, year-by-year-by-year, again, a variation.
12 There isn't some magic number, thou shalt do 2,000
13 square kilometres of operational cruise annually.

14 As was explained, it is done and what the
15 manager decides is what work is needed as a piece of
16 the supplementary information we described earlier.

17 And on 232 we have a figure and 232 has
18 also been changed the way 230 was to include, on each
19 of the vertical histogram bar values, what the actual
20 numerical value was, the actual dollar value was on top
21 of each bar that you would get if you read across to
22 the vertical scale. So there is a change on this
23 diagram also on 232.

24 The costs are given in millions as they
25 were for the FRI and, remembering, the FRI costs were

1 running in the order of \$1-, \$1.5-, \$2-million, just to
2 sort of make a comparison mentally. So the operational
3 cruise costs, 83-84, are shown and how much was spent
4 per year in the activities classified as operational
5 cruises.

6 The last diagram tries to provide a
7 picture, to provide a picture to illustrate the point
8 that I was making when I said operational cruises are
9 expensive in comparison with the FRI.

10 So the diagram on page 233, which
11 compares the FRI to the operational cruise costs per
12 square kilometre for the five-year period, 1983 to
13 1987, and the costs are given on a per kilometre basis,
14 and typically the FRI figures are running - and they
15 are the yellow, the left-hand box on the diagram - the
16 FRI values are given in the left-hand box for each of
17 the two -- for each of the five years, and the values
18 that we are running in square kilometres in costs
19 there, if you -- the numbers run in the order of 45,
20 going up to I think close to 90, in the case of 1987.

21 So the numbers per square kilometre are
22 45, 46, I think it is around \$50 per square kilometre
23 for the total FRI process.

24 So in terms of keeping track of what do
25 we spend, what do we the Ministry spend in forest

1 resource inventory, what is charged against it, the
2 dollar costs I have shown on page 230. Those costs in
3 comparison with the area covered in the FRI show up the
4 cost of square kilometre of running from \$40- to \$50 a
5 square kilometre up to, I think, up to \$90 a square
6 kilometre over that five-year period.

7 Annual variation, annual variation to be
8 expected for a variety of reasons. The actual area
9 covered in the FRI may have varied, the area covered in
10 terms of its complexity, the scale at which the maps
11 were produced, a whole range of reasons why those costs
12 per square kilometre can vary.

13 The other bar on the diagram illustrates
14 the cost per square kilometre of the operational
15 cruising. Again, based on the work and the costs we
16 have a value in operational cruising running in the
17 order of \$8- to \$700 per square kilometre.

18 To try and make some sort of very crude
19 comparison of approximately what those costs are
20 between the two methods of inventory, this evidence
21 illustrates some magnitude of what those differences
22 are on a per kilometre basis, square kilometre basis.

23 Now, I want to leave the operational
24 cruise at the moment with the thought that although
25 that last line demonstrates that difference in cost,

1 there are instances - as we have said earlier - where
2 the operational cruise is a technique that is and
3 should be used, in my professional opinion, in some
4 instances of capturing those additional data.

5 We had list of why do I need additional
6 data, we had a list of techniques available to collect
7 the additional data, and there are sometimes when you
8 think through and that method that I have just
9 described of operational cruising is the appropriate
10 way of collecting those data with a caveat. And the
11 caveat is a pragmatic caveat because we went through,
12 at some detail, describing how to make, for example, a
13 volumetric estimate at the stand level and we have
14 demonstrated that at the stand level you needed a
15 relatively large sample if you wanted a reliable
16 estimate.

17 Now, the pragmatic answer to that is: Do
18 you really need it at the stand level? Can you in fact
19 not make a useful estimate at the 10-stand level or the
20 20-stand level? Can we not have an estimate that isn't
21 stand-by-stand but an estimate that is block-by-block
22 of 5 stands or 10 stands, or can we not make an
23 estimate of the volume in this year's annual cutting
24 chance?

25 Do I really need to know exactly what I

1 have got stand-by-stand, or do I want an estimate for
2 all of the stands I think I am going to cut this year.

3 And you can take it further: Do I really
4 want an estimate on an annual basis or do I need an
5 estimate that over the next five years, approximately
6 an estimate, what have I got.

7 So pragmatically be well aware from what
8 we have gone through and demonstrating the variability
9 impacts on the number of samples, let's think about
10 this and realize that for some instances when we do an
11 OPC it may be practical to have an estimate on the
12 10-stand basis or the 20-stand basis.

13 So when you look at the process, when you
14 look at the costs, let's make sure we use the technique
15 wisely, where it is appropriate, and in the most
16 appropriate fashion.

17 MRS. KOVEN: Could you please give me
18 examples of the parties who would want stand-by-stand
19 information and what they would want that information
20 for?

21 DR. OSBORN: Yes. The easiest way to
22 cite a recent reference to that is in the Rosehart
23 Report which was cited yesterday as exhibit...

24 MRS. KOVEN: 92.

25 DR. OSBORN: Thank you. Exhibit 92.

1 There was a reference in here which I will pursue in
2 more detail and try and find. There is a reference in
3 here, in answer to your question, Mrs. Koven, of small
4 operators being upset, small logging operators being
5 upset with the inaccuracies of the forest resources
6 inventory.

7 Now, the inference behind the statement -
8 and not knowing who the parties were who spoke to the
9 Rosehart Committee- the inference behind the statement
10 is small logging operators looking at 1, 2, 3, 4, 5, 10
11 stands, small operation, may want because of the size
12 of the operation they conduct to know stand-by-stand,
13 10-stands by 10-stands.

14 They may pay operators on certain basis
15 stand-by-stand, they may want to set people in a stand
16 versus a stand versus a stand basis. So people who may
17 have an interest in the smaller scale of operation may
18 well need data where they can serve at that stand size
19 piece of geography; whereas a larger forestry operator
20 may well have an interest in not stand-by-stand but in
21 this year's operations what do I need.

22 To answer your question, typically a
23 person who is concerned on a stand basis, their area of
24 management activity, a small operator, would want that
25 level of information to give him or her some better

1 handle or better estimate of what have I got there.

2 MRS. KOVEN: Given that your Ministry
3 serves equally large industry and small industry, are
4 there other ways that you would provide information to
5 the small operator other than going to the FRI?

6 I mean, is it possible to use the forest
7 manager to provide that information rather than...

8 DR. OSBORN: Yes. If I come back to the
9 question earlier of: When do you need the additional
10 information and how can you collect it, it was a
11 question in yesterday's examination.

12 If I need to get a better volume estimate
13 than the FRI has for the small operator I have a choice
14 of the ways of obtaining that, and I think there is a
15 list of -- I look at previous records; the FRI
16 traditionally has given me such and such in adjacent
17 areas.

18 So without doing the cruise, typically
19 the area I am in has been producing 200, 250 cubic
20 metres per hectare, and cutting in the next one, in the
21 next period of time, small operator, one or two stands
22 of jack pine, 80-years-old, I cut last year jack pine
23 80-years-old, I was getting out of those 200 cubic
24 metres per hectare. Without going on the ground and
25 cruising, I could presuppose the areas were similar.

1 So local knowledge, local estimate, past
2 records would enable me, without necessarily doing an
3 OPC, to turn to the small operator and infer from what
4 we have seen before, what you maybe cut before, and you
5 typically got out of this area this and this, the areas
6 look similar or the areas look different, and we will
7 make adjustments.

8 So, yes, the Ministry does do this sort
9 of operation, talk to local operator: What have you
10 got out of this before, have you been here before.
11 Well, before previous operators got this.

12 So there is a local knowledge, local set
13 of experience, if you like, which foresters gradually
14 build up and operators build up, and by the time you
15 get to companies who have expert people on location for
16 some time, this body of knowledge builds up that most
17 operators know, on this kind of forest, what they
18 typically have got out of it after certain operations
19 have gone through.

20 Now, the operational cruise may be needed
21 if you want to look at a product that hasn't been
22 realized before. All of a sudden somebody comes in who
23 just wants saw logs of 10 inches, 30 centimetres and
24 larger - and we have not been through that before, the
25 previous operation has cut all the trees down to 10

1 centimetres before.

2 Okay, now we have got some difficulty.
3 Now, we might need to go and do an operational cruise
4 because we are looking for something now in which our
5 background and our knowledge is limited if not
6 non-existent. So a whole degree of pragmatism.

7 MRS. KOVEN: But the economic rationale
8 in that would be by the size. So it really makes sense
9 economically to do OPCs on the basis of large sized
10 products?

11 DR. OSBORN: Because of the dollars and
12 cents and because of what I have inferred here, you
13 have to be aware that it is not a cheap process that,
14 yes, you have got to be really realizing is your
15 product, is what you are chasing really worth the
16 expense of putting the plots in. So there is literally
17 a tradeoff, yes, and, typically, for the more valuable
18 products.

19 In the area of the undertaking, if we
20 move further south, we come into the Algonquin region
21 and the toll on hardwoods which is very much a hardwood
22 quality product-oriented type forest industry.
23 Typically in the Algonquin region they will do much
24 more operational cruise and, in fact, to continue, the
25 Algonquin region is being inventoried right now, much

1 of the data for the forest resources inventory is
2 operational cruise data from the Algonquin staff.

3 So I will incorporate in the FRI the
4 operational cruise data because the forests are of such
5 importance and value in terms of quality that that sort
6 of work is worth -- work is done of cruising and
7 thought worthwhile.

8 THE CHAIRMAN: Dr. Osborn, just along
9 those lines as well, are you getting -- is the Ministry
10 getting requests for additional data such that an
11 operational cruise might provide from other than timber
12 users, from the alternate users of the forest such as
13 conservationists, environmentalists, people interested
14 in the uses of parks and the uses of the forest for
15 other than the timber resource?

16 DR. OSBORN: The simple answer, sir, is:
17 I don't know back at the level I work in FRI. It is a
18 question that really should surface later with field
19 people, but there certainly are the desire on other
20 parties to have estimates that go beyond or add
21 variables to that which is in the FRI.

22 And, if I may for a moment, on that very
23 question, this particular year we were approached
24 actually through part of the Ministry, but with
25 relation to variables speaking to wildlife habitat. So

1 the FRI section was approached: What can we do this
2 year in the taking of samples actually in the FRI
3 process that will not only pick up the data that we
4 described when we walked around with the prism, but at
5 the same time what can we collect of a wildlife habitat
6 type of information that would serve the purposes of
7 land users worried about and concerned with wildlife
8 habitat.

9 Now, that experiment was proposed, and
10 for some adamant reasons it has been postponed this
11 year, but literally in the Algonquin region where -- in
12 terms of habitat this was particularly a question, this
13 came out one of the workload pieces of what is called
14 the Technology Development Unit in North Bay with
15 responsibilities for timber and wildlife, and the
16 request came through: Can we not marry, can we not
17 merge the survey, whatever survey, to pick up more than
18 the one set of variables.

19 Yes, the request has come and we have
20 looked at what can we pick up or what people do we add
21 to the team to ensure that we can measure and evaluate
22 and tally because of the --

23 THE CHAIRMAN: Because if you did it in a
24 multi-disciplinary fashion you would be saving, in the
25 long run, having to send out wildlife people to do the

1 same -- not the same type of survey, but perhaps to the
2 same areas to obtain that kind of information that will
3 be helpful in whatever they are pursuing.

4 DR. OSBORN: I generally agree with you,
5 but again with a caveat that - and I made reference I
6 think the day before yesterday to U.S. Forest Service
7 expertise in this - the plots that are put in from a
8 forestry point of view, which we have described, may or
9 may not be the most sensible place to put plots or the
10 same shape of plots for other purposes.

11 Now, I'm not trying to be awkward, but it
12 is merely that what the foresters look at and what
13 might make sense and use practicality from forestry
14 point of view, on those same plots, you could collect
15 other data. And that is typically what the U.S. Forest
16 Service has done, just as you described.

17 However, that sampling scheme may or may
18 not be the most suitable to pick up wildlife habitat,
19 for example.

20 THE CHAIRMAN: All I am getting at, it
21 is an option worth looking at--

22 DR. OSBORN: Yes, sir.

23 THE CHAIRMAN: --to see if it could be
24 cost effective?

25 DR. OSBORN: Yes.

1 THE CHAIRMAN: And if it cannot be, then
2 fine you do separate one. But if it can be, then
3 perhaps that kind of innovation for the future, since I
4 understand it has not been done in the past in that
5 co-ordinated fashion, might be desirable.

6 DR. OSBORN: Very much so. To pursue
7 that, in the FRI we talked of brush and older and I
8 made reference to the foresters to seeing that
9 non-productive.

10 We have discussed with wildlife people,
11 can we take brush and older and classify it in a way
12 that makes more sense from a habitat point of view.
13 That is not production forest, the foresters don't have
14 it in the timber base. In the FRI photointerpretation
15 what, if anything, can we ascertain that leads itself
16 to moose habitat.

17 So, yes, sir.

18 MR. FREIDIN: Q. And in relation to the
19 type of inventory that the Chairman referred to, did
20 the Rosehart Report refer to doing an inventory of
21 natural resources other than trees?

22 DR. OSBORN: A. In the Rosehart Report,
23 in fact the first, I suppose, two recommendations in
24 the Rosehart report.

25 The first one, the first recommendation

1 in the Rosehart Report was that the Ministry in fact
2 create what was called a natural resources information
3 service, NRIS. In essence, the concept, just that
4 which was exemplified, just that which was explained,
5 is why don't you consider this as a whole in natural
6 resources.

7 And the second recommendation said: And
8 the structure of that should be a group of experts in
9 main office responsible for standards and policies,
10 compatibility and design. And the second half of the
11 second recommendation said the people in the field
12 should be the people who go and collect the data and
13 analyze it and synthesize it and aggregate it and
14 collect it and compile it and keep it up to date
15 without exactly saying where in the field they meant in
16 all due respect.

17 Now, so the suggestion was do this and
18 organize the people this way. And just to pursue that
19 one. The Ministry's reaction at the moment has been:
20 We hear you, this is a very viable suggestion and this
21 requires us to think how we structure people, it
22 requires us to think exactly how we organize and who is
23 going to collect what, where and how. Okay.

24 Administrative concepts it's true, but
25 with the experience I hear from the U.S. Forest

1 Service: Don't turn that recommendation on overnight
2 without fully realizing where you are going to go.

3 So the Ministry will give that serious
4 thought as to how that turns into be practical and what
5 they may well do - as much as, Mr. Chairman, you
6 suggested - is experiment in one or two locations as to
7 how does this work, how practical is this, can we get
8 the various users to identify exactly what they want
9 collected in a form and fashion that is practical.

10 Yes, Mr. Martel?

11 MR. MARTEL: One of the perceived
12 difficulties in this whole field might be precisely the
13 fact that you don't do it, that the emphasis appears to
14 be primarily harvesting.

15 With people at large, the people who you
16 come in contact with, there seems to be a perception
17 that all of the resources are directed to the one area
18 which is harvesting as opposed to the total utilization
19 of the forest.

20 Unless you get a document of some
21 description, how do you overcome that fear in the
22 public's mind?

23 DR. OSBORN: I am not really sure, and I
24 have some difficulties as a professional in imagining a
25 document that describes the forest -- a very pragmatic

1 point of view I really unfortunately, as a
2 professional, do not have an easy answer to that
3 question.

4 I understand the question and I
5 understand the dilemma, but I have been accused that the
6 FRI only goes so far in the forestry sense. How you
7 resolve it practically is one issue and then how you
8 convince the public you have resolved it is a second
9 issue. There are two problems there.

10 Even the first one, technically, of
11 trying marry the resources into a whole system is
12 difficult; with one comment, technology may - and we
13 will speak about this a little later - technology may
14 offer us a help in this and just to dwell on that for
15 just a moment. The system -- the document that you
16 allude to might come out that looks like: Here is the
17 layer of timber...

18 Actually, let's start from the bottom,
19 here is the layer of the land, the Ontario base map,
20 here is the layer of the soils map, here is the layer
21 of the timber cover. In the timber cover, here is the
22 layer of vegetation that isn't the trees, here is the
23 layer that translate into wildlife habitat.

24 So this series of overlays, which you
25 could do now at the moment in a physical sense and has

1 been tried, the technology permits you now to consider
2 putting those overlays together and analysing that
3 complex hole.

4 That's very easy for me here to sit here
5 and say, it is a lot more difficult to both put those
6 pieces together usefully and even more difficult to
7 understand what you have got and how you analyse it.

8 So to come back to your question. It is
9 possible to present such a picture and there are tools
10 available to help towards that, and we will speak a
11 little bit later about geographic information systems
12 technology which is merely a tool to help with being
13 able to present such a picture.

14 The complexities of how to present that
15 picture get large and I will give you one example
16 staying in forestry for a moment, the forest stand map,
17 for example, has no contours on it. The forest stand
18 map has planimetry and a forest cover with no contours.

19 Now surely, contours are important and
20 yet if I add contours to the forest stand map, the
21 amount of data on there, the amount of information on
22 there, is that map becomes even more a solid black set
23 of lines that is very hard to interpret, what am I
24 looking at.

25 We have - I used the expression earlier -

1 a noisy map. If I add the soils and I add wildlife
2 habitat, I end up with a product that is hard to
3 analyse. And, in fact, I am not sure whether Panel 2
4 explained, there was back in the 50s a Canada Land
5 Inventory Scheme and the Canada Land Inventory Scheme
6 had something similar to that which you are describing;
7 the land, its productivity in relation to trees, its
8 productivity in relation to other features.

9 Now, they produce separate maps for each
10 of the uses. You could have put all of those maps in
11 front of each other and tried to look them through them
12 and see what do I do next. And technology let's you a
13 little bit better now than in the 50s do that, but the
14 analysis associated with that intermixing the features
15 of the forest in totality is complex.

16 THE CHAIRMAN: Dr. Osborn, if you took a
17 look at a stand map and you were doing your location
18 plots for the data-gathering process, would you then
19 also be looking at a topographical map as a separate
20 document to find out where we get access to that or
21 where we are going to be climbing a small mountain and
22 that kind of thing?

23 DR. OSBORN: In the forest resource
24 inventory, sir, I know the people will use the
25 photograph, the photograph in stereoscopic vision --

1 you very practically learn whether or not you are going
2 to go up and down plots or up and down cliffs. So
3 they use the photograph typically in the FRI.

4 Operational cruise, field forester will
5 probably use a mix of both, both the photographs,
6 again, photointerpret, could see the topography and/or
7 a matter of topographic series map 1:50,000 poplar map,
8 yes.

9 THE CHAIRMAN: So the information is
10 available it is just not all combined?

11 DR. OSBORN: Yes. To come back to Mr.
12 Martel's suggestion of trying to show it all in -- I
13 will use one document, is very complex and maybe
14 separating the layers and showing the layers with the
15 realization they can be put together is perhaps the way
16 to go.

17 And so the second half of the suggestion:
18 How do we convince the public that we know where we are
19 at, how do we put that document together and the
20 explanation of what the document means so the public
21 comprehend exactly what we have and believe in what we
22 say.

23 MR. FREIDIN: All right.

24 THE CHAIRMAN: We threw you off; didn't
25 we?

1 MR. FREIDIN: No, no.

2 Q. We were talking about - before the
3 questions were asked by the Board - about the Ministry
4 response, I think you probably provided it.

5 Are you aware as to whether in fact the
6 Ministry's -- how the Ministry is going to deal with
7 that particular recommendation is actually documented
8 in Exhibit No. 93 which was the recommendations and
9 Ministry response to the Rosehart Report? I think it
10 is 93, Mr. Chairman.

11 THE CHAIRMAN: 93 seems to be the report.

12 MR. MARTEL: 93 is the report.

13 MR. FREIDIN: 92 is the -- I am sorry.

14 MR. MARTEL: The exhibit is 92.

15 MR. FREIDIN: Oh, it is part of 92. It
16 wasn't given a separate number then.

17 MRS. KOVEN: Did we do A and B or...

18 THE CHAIRMAN: I had Exhibit 92 as the
19 Newsrelease dated June 9 and 93 as the Rosehart REPORT
20 itself.

21 MR. FREIDIN: Q. If you go to then
22 Exhibit 92 and turn to page 3, is the recommendation
23 from the Rosehart Report in relation to the natural
24 resource information service referred to under the
25 heading -- the second heading: Recommendations Which

1 Will Be Closely Studied For Possible Further
2 Implemenation?

3 DR. OSBORN: A. That is correct.

4 Q. And there are a number of points
5 under there which in fact refer to the recommendation
6 regarding a natural resources information service; is
7 that correct?

8 A. That is correct.

9 Q. Dr. Osborn, let me put this
10 question -- well, let me put a hypothetical to you. If
11 somebody came to you and said: I think that
12 operational cruises should be done everywhere on every
13 management unit in relation to every timber management
14 planning process, what would your response be?

15 THE CHAIRMAN: Remember that we have a
16 transcript and it has to be printable.

17 DR. OSBORN: I was going to be polite,
18 Mr. Chairman, and say: Please think a little bit more
19 carefully. I understand.

20 But I literally would ask the person
21 seriously whether or not they really understand what
22 they are suggesting and what the implications of such a
23 suggestion are. In a nutshell, no.

24 MR. FREIDIN: Q. When an FRI is done and
25 the crew that does the ground sampling goes out to do

1 their measurements in the plots which they have set
2 out, do you know whether they collect any information
3 other than information about the tree heights and their
4 diameters?

5 DR. OSBORN: A. Yes, they do.

6 Q. And could you please advise what type
7 of information that might be? Is that recorded on one
8 of the documents in the tally sheet?

9 A. Yes, it is.

10 Q. Page 164 of the witness statement.

11 A. 164. On page 164 which is the back
12 and the front -- an example of the back and the front
13 of a tally sheet associated with -- sorry, Mr.
14 Chairman. The tally sheet is associated with the FRI
15 cruise and this is physically what they are, but page
16 164 is a photocopy of this kind of document.

17 Q. What are you referring to when you
18 say this kind of document, for the record?

19 A. A document labeled FRI tally sheet.

20 Q. And you have got a series of them?

21 A. Yes, I do. I have a series of them.

22 The first page, front and back being
23 essentially not the same copy, photocopy on page 164.
24 The one on page 164 happens to be for Dryden. This
25 happens to be a set from the Keewatin managment unit in

1 Kenora.

2 On page 164, if we look at the part
3 labeled front, and if we come to the fourth box, fourth
4 box from the top, we have a box that's labeled
5 understory, species age and stocking. And so when the
6 FRI crews go through on the tally sheet, if there was
7 understory --

8 THE CHAIRMAN: What is understory, Dr.
9 Osborn?

10 DR. OSBORN: The easiest -- if I think of
11 a vertical transect in the forest, I have my canopy
12 layer, which typically in most parts of Ontario is the
13 top part of the trees where the crowns are, I have an
14 understory which is trees that haven't -- that aren't
15 in that top canopy layer but are shorter than, so a
16 sort of subset layer underneath the canopy. Under the
17 story, the story being that top canopy, and if I
18 continue my vertical transect coming down the canopy --
19 coming down the forest vertically, I am into typically
20 what is called the shrub layer.

21 So vegetation in different parts of the
22 three dimensions of the forest, canopy at the top,
23 understory in the middle, shrub layer at the bottom.

24 MR. FREIDIN: Q. Dr. Osborn, if you take
25 a look at -- unfortunately again I don't have the copy

1 in the witness statement, but if you go back in that
2 particular document, 21 to the heading Field
3 Procedures...

4 A. It is on page 153?

5 Q. And on the right-hand side it says
6 FRI tally sheet front, near the bottom?

7 A. Yes.

8 Q. It contains, does it not, on the next
9 page a definition of the various items in the various
10 boxes located in the tally sheet which is shown on page
11 164?

12 A. Yes, it does.

13 Q. And do you know whether -- well, do
14 you know if one of those have been changed or are no
15 longer a proper description?

16 A. No, the definition for understory
17 remains as is given on page 154 and essentially, in
18 practical terms, was that which I described.

19 So if we return back to page 164, in that
20 fourth box under Front we have understory and if it is
21 there, if it is found by the tally people, it is
22 recorded as to species, age and some estimation of
23 stocking. So we may well find a tree species that may
24 or may not be commercial but which may or may not be
25 there in sufficient number that would be tallied.

1 An example would be, for example, hazel
2 trees, the example might well be older trees, neither
3 which are commercial species in the FRI sense, but may
4 well be understory species which would be tallied in
5 understory.

6 To continue the line of question as to
7 the box beside understory we have shrubs and we have
8 exemplified shrubs either in the next canopy layer
9 down, do we have all sorts of dogwood, osier and bushes
10 and pieces of vegetation at that 1, 2, 3, 4, 5 metre
11 type height level which, again, if present, are tallied
12 as regards an approximation of age and stocking.

13 And we are really trying to give an
14 inference of what is there and that has a bearing upon
15 possibly timber management activities as would be
16 described by other experts, and/or - which is where
17 this question started - other potential uses of those
18 data.

19 Just to stop right there for a moment, in
20 the example alluded to earlier about the proposed trial
21 in the Algonquin region, it is this understory shrub
22 layer, box, that was the most logical thought at the
23 moment of where we may record what particular
24 vegetation was of interest from a wildlife habitat
25 point of view.

1 So we needed people trained in knowing
2 which particular species, understory and shrub for the
3 food materials for those species. So here is an
4 example on the FRI tally sheet without almost any
5 change. We could perhaps accommodate the recording of
6 those, given we knew which they were and what was
7 important.

8 If we go beneath that, that layer into
9 the fifth set of boxes, there are two boxes, one
10 labeled regeneration and one labeled soil. The
11 regeneration essentially is a tree layer of young trees
12 and, again, the definition exactly of what is meant by
13 regeneration is given on page 154. So the tally man
14 has some understanding of what constitutes regeneration
15 and, again, records as they go through the 10 sample
16 plots, the 10 stations, what species, what age and what
17 stocking.

18 Again, it has a both forest management
19 and a potential other users' significance. So it is
20 recorded, and the box to the right-hand side of that,
21 which describes soil, is an approximation of as they go
22 through both the 10 stations and the stand, observation
23 of what kind of stand, what the material is, some
24 indication of its depth and its moisture content. The
25 three basic parameters typically one worries about with

1 soil.

2 MR. MARTEL: Is that done on all sheets
3 or unless ordered?

4 DR. OSBORN: Not necessarily, sir. For
5 example, you are talking about soils specifically?

6 MR. MARTEL: No. Those last four boxes
7 we are looking at. I mean...

8 DR. OSBORN: You will notice no value in
9 understory, no value in shrub.

10 MR. MARTEL: Right.

11 DR. OSBORN: Now, one presupposes - we
12 are back with trained staff again - one presupposes the
13 fact there are no values indicates there was no
14 shrubbery and no understory.

15 Now, as a manager with a degree of
16 cynicism, I look at that and the fact that it was not
17 indicated, the fact that it was slashed off indicates
18 they looked and there was nothing there.

19 So you asked a question: Is it done on
20 all plots. Yes, it is done on all plots, the
21 non-recording infers there was nothing there.

22 MR. FREIDIN: Q. In terms of operational
23 cruises, are you aware as to whether during operational
24 cruises information is collected in relation to the
25 areas that are visited which are collected for use in

1 making decisions related to values other than timber?

2 And I put that question to both of you.

3 If you can't answer I would ask Mr. Armson whether he
4 can answer it.

5 DR. OSBORN: A. With no operating
6 experience with the operational cruise in Ontario, with
7 no immediate connection, I am in no position under oath
8 to comment as to yes or no.

9 Q. Are you able to comment?

10 MR. ARMSON: A. No, I can't comment on
11 that because I am not involved in the field operation.

12 Q. The information that gets put on the
13 tally sheets, Dr. Osborn, do they or a copy of them end
14 up in the district offices?

15 DR. OSBORN: A. Could I ask which tally
16 sheets we are alluding to? Are we talking FRI or are
17 we talking operational cruise?

18 Q. FRI.

19 A. Tally sheets that are the FRI tally
20 sheets, the bundle of which that came from Keewatin
21 that I showed, these tally sheets end up at the end of
22 the FRI procedure back with the district staff. So
23 they reside in the district office.

24 Q. So that if a district biologist or a
25 forester in one of the management units in the district

1 or any other staff for the Ministry of Natural
2 Resources wanted to look at that it would be available
3 in the district office?

4 A. That is correct.

5 Q. Could the public look at that if it
6 came in and asked to see them?

7 A. As far as I know, yes. Not knowing
8 the exact operational procedures and/or the exact --
9 yes.

10 Q. Thank you.

11 THE CHAIRMAN: Mr. Freidin, it is the
12 Board's intention to break for a short time for lunch
13 at some point, either soon or by twelve o'clock, then
14 we would return probably, I guess, three quarters of an
15 hour to an hour later and then finish off with an
16 afternoon session ending about 2:00 to 2:15, in that
17 range.

18 MR. FREIDIN: Well, this would be as
19 appropriate a time to break as any.

20 THE CHAIRMAN: Okay. Why don't we break
21 then until a quarter to one and we will resume at that
22 time.

23 Thank you.

24 One thing, just before we go. Mr. Tuer,
25 if your group and Mr. Freidin's group has that

1 information regarding the site visits, if you would
2 arrange to get them to Mr. Mander's office.

3 What we are purporting to do is to make
4 copies of them for the three Board members so we can
5 take them with us over the weekend and then we will
6 meet on Monday to finalize our itinerary.

7 MR. TUER: I can do that right now.

8 THE CHAIRMAN: Okay.

9 ---Luncheon recess at 11:45 a.m.

10 ---Upon resuming at 12:45 p.m.

11 THE CHAIRMAN: Thank you, ladies and
12 gentlemen. Please be seated.

13 MR. FREIDIN: Mr. Chairman, before I
14 resume the questioning of Dr. Osborn, I would just like
15 to advise that in relation to the subject matters
16 raised this morning that data collection and
17 information available in the district in relation to
18 both timber and non-timber values will be addressed by
19 Panel No. 7.

20 I can also advise that in that panel the
21 evidence will indicate that during operational cruises
22 it is common for information to be collected regarding
23 non-timber values or information which will assist in
24 making decisions regarding non-timber values.

25 Q. Dr. Osborn, could you advise, does

1 the Rosehart Report contain any recommendations
2 regarding operational cruises?

3 DR. OSBORN: A. Yes, sir, it does.

4 Q. And could you direct the Board to the
5 page in Exhibit No. 93 where they can find that
6 recommendation?

7 A. The recommendation is given on page
8 20.

9 Q. And that is summary of the
10 recommendations in that section?

11 A. That is -- it says the List of
12 Recommendations.

13 Q. All right, thank you.

14 A. It is the title on page 19. And the
15 recommendation No. 19 on page 20 reads:

16 "The Ministry of Natural Resources
17 emphasized the importance of operational
18 survey (cruise) design and skill
19 development for the post-secondary
20 institutions involved in forestry
21 education in the Province of Ontario; and
22 (2) that the Ministry of Natural
23 Resource produce a provincial operational
24 survey manual which would provide
25 guidelines for the design and

1 implementation of operational cruises."

2 Q. Could you advise what the Ministry's
3 response was and, if possible, could you refer to any
4 portion of Exhibit No. 92 which has the Ministry's
5 response in relation to that recommendation?

6 I think you will find a reference to
7 that...

8 A. Yes, on Exhibit 92, on page -- it is
9 on the last page, would be the easiest way to refer to
10 it. It has got a 3 at the top and a 30 at the bottom.

11 So on the last page of Exhibit 92, in the
12 fourth point down from the top of the page under the
13 heading: Recommendations Being Considered For Early
14 Implementation, the fourth point on that last page
15 reads:

16 "More support for forestry schools in
17 encouraging the development of
18 operational survey skills and the
19 production of an operational manual for
20 this and other purposes."

21 It is the position of the Ministry with
22 that particular recommendation is as inferred on that
23 last page of Exhibit 92, is that we will consider and
24 develop and pass on to the forestry schools such
25 information as we have in manual design to aid in the

1 education of forestry professionals and forestry
2 technicians in that subject.

3 Q. And you feel that is an important
4 thing to do?

5 A. As was described when we went through
6 the operational cruise procedure, comment was made as
7 to the need for trained staff both in the design,
8 thinking, planning process and in the execution. So in
9 both facets of how do I do it, and the actual doing of
10 it, both facets need to use existing trained staff.

11 So, yes, unless those staff are trained
12 coming through the schools in both technical and/or
13 professional, there is going to be some potential
14 problems in trying to execute that practice.

15 Q. Thank you. I would like to go to
16 another topic now, if I might, Dr. Osborn, still within
17 the FRI.

18 If we go back to paragraphs 35 and 38,
19 the subject matter of who actually prepares the
20 inventory is dealt with. And I understand that you
21 have an overhead which you wanted to use in order to
22 address this particular subject matter.

23 A. Which is given on page 237 and pages
24 238 of the evidence.

25 Now, this is really one exhibit that

1 happens to go over on to two pages, 237 and 238, in
2 terms of size of the printing. It is essentially a
3 chart that describes the major participants in the
4 creation or the creating of Ontario's FRI by function.

5 So that the chart's basic structure is on
6 the left-hand column, there is a set of functions or
7 activities within the FRI process. The central column
8 on the chart, which is headed Agent, briefly describes
9 who, what group of people in a collective sense are the
10 people doing that particular function. And the third
11 column, which is headed Comment, makes a sort of brief
12 comment as to where and who and why and the
13 implications.

14 So within the Comments column is a
15 variety of little sort of footnotes that if these
16 people do this function what may be some consequences
17 and/or implications of the same.

18 So if we go through the chart which in a
19 way sort of provides a summary of what was the FRI all
20 about and what the processes were, the first function
21 was aerial photography and the agency, as was
22 explained, was the commercial contract and the comment
23 reads:

24 "As of currently only 3-4, 4-5 companies
25 in the business."

1 In the Ontario and Manitoba, Quebec border range. It
2 doesn't say that on the diagram, but the only three or
3 four qualified companies in the business were within
4 economic distance of the Ontario requirements.

5 So the potential problem as far as the
6 Ministry is concerned to ensure there is enough
7 expertise around to do this and the administrative
8 problem of if we end up with one company we end up in a
9 monopolistic situation which is not always very
10 successful or not very good.

11 Just as an aside, we have essentially
12 followed that route of commercial contract, commercial
13 air services providing aerial photo coverage for us
14 since the late 50s. We have not -- we, the Ministry,
15 have not done that sort of work for some time.

16 And as another aside, that has been very
17 successful because of the interaction with the
18 companies as to the specifications. Good dialogue
19 between the company and, in this case, Crown as to what
20 is really required and how well can they produce it.
21 That seems to be relatively successful the way it has
22 gone.

23 The second major function on the chart
24 was ground cruising and the agency is -- and there are
25 three possible agencies listed, three sets of people,

1 all of whom have been involved in one location of the
2 province or another in doing this. The first was MNR
3 staff plus contract. So MNR may in fact use casual
4 contract staff on its payroll, that is what that
5 contractor allusion is made to.

6 The third -- the second agency under
7 ground cruising was pulp and paper referring to pulp
8 and paper company's staff. And the third major agency
9 in ground cruising was a commercial contractor, private
10 company who offered services in FRI cruising skills and
11 capability.

12 MR. MARTEL: Could you answer something?

13 DR. OSBORN: Yes, sir.

14 MR. MARTEL: Are there people out there
15 who are not employed either by the Ministry or by the
16 industry who are in a position, have the expertise to
17 go out and do that sort of contractual work?

18 DR. OSBORN: Yes, sir, there are. That
19 is why item C, commercial contractors, do exist. There
20 is a company actually right here in Thunder Bay with
21 those skills.

22 MR. MARTEL: Are they generally
23 province-wide or just varied?

24 DR. OSBORN: It depends on the size of
25 the company. The company here in Thunder Bay in fact

1 has done services for us in most, if not all, of the
2 province. And the extreme southeast from Thunder Bay
3 is economically a poor idea. So in and around the
4 Ministry's northcentral, the northwestern regions,
5 maybe some of the northern regions, that is quite an
6 economic possibility for that company based in Thunder
7 Bay to provide that service, and they bid on a tendered
8 contract.

9 And, as another extreme, within, for
10 example, Hearst, there is a private contractor, in a
11 very small company who will provide services for this
12 sort of thing in and around the Hearst area but not
13 much further afield. So it ranges from very localized
14 local application to a relatively large company that
15 can almost go province-wide.

16 There is a company, for example, in
17 Ottawa that has provided this kind of service to us
18 across the province. There is a range of answers to
19 your question. So three sets of agencies.

20 For the MNR staff and MNR's contract
21 staff, what sort of location, what sort of units do
22 they do that work on? It is done on all the Crown
23 management units and some of the FMA or company
24 management units. So Crown staff maybe do the grounds
25 cruising, certainly on the Crown management units, and

1 this was asked before: Does the Crown staff not do FRI
2 for Crown purposes. The answer yes, ground data.

3 On some of the FMAs or company units the
4 Crown may do either some or, in cases, all of the
5 ground cruising. So it will vary, it will vary.

6 Pulp and paper companies, the large
7 licenceses, typically do ground cruising on their own
8 FMA and/or licence and we make a very concerted effort
9 within the Crown to have this particular operation done
10 by the local forestry staff of the licensee, the large
11 licensee. Very often their staff have been on the area
12 for the some time, they have local knowledge of what
13 typically has come up in the area, where things are,
14 local variability, we have been through a whole range
15 of operational concerns and using literally the on-site
16 staff is what we try and go with.

17 MRS. KOVEN: Excuse me, are they trained
18 and supervised by the management unit?

19 DR. OSBORN: When they do this work they
20 do it according to the specifications that the Crown
21 has laid out for ground cruising. So the Ministry has
22 specs for ground cruising for the FRI that we tender in
23 commercial contracts. Those same specs, if you like,
24 are given to the pulp and paper company: You do the
25 work on your area, on your licensed area, and you do it

1 according to the way we want it done.

2 And typically our own Ministry staff will
3 go out to the location of the licensee, sometime in
4 May-June, will go through a week, maybe two-week
5 training course: Do you understand how it is done, why
6 it is done, go through the tally sheet, go through the
7 process, literally on-site, let's go and do a week,
8 two-week trial, make sure you understand how you are
9 doing it.

10 And then we will let them do that work.
11 We will ask them to supervise what they are doing. We
12 in turn -- we, the Ministry, in turn will go and check
13 cruise, again, as was explained when we had somebody
14 other than the Crown do this.

15 And, similarly, when we use commercial
16 contracts, again, they are done on Crown management
17 units and they may well be done on FMAs or company
18 units, and some large licensees may, through not having
19 any trained staff of their own, contract commercially
20 for that work to be done on their FMA holding.

21 So the range of permutations of who does
22 what, again, done according to spec, check cruised by
23 the Ministry of Natural Resources.

24 MR. MARTEL: What if someone on your
25 staff or in one of the field offices suggested that

1 there wasn't enough in the forest resources inventory
2 to provide a product to a company, do they have that
3 ability to say: No, there isn't enough there or we
4 just don't have the quantity of wood that is demanded
5 and, therefore, we have to pull back?

6 DR. OSBORN: If I understand the
7 question, a particular licence -- a particular block
8 where, if I hear you say, if on that block the estimate
9 is: We have 10 out there and, if I hear you asking,
10 the company says it wants 12...?

11 MR. MARTEL: Yes.

12 DR. OSBORN: The answer will be spoken
13 to, Mr. Martel, actually in this very panel by Mr.
14 Armson when we talk about wood flow. That very
15 question will be spoken to.

16 Ground cruising we talked about.

17 The next step we have got is the
18 photointerpretation, the agencies delivering
19 photointerpretation. Again, the choice or the range of
20 Ministry head office staff - and this is written at
21 head office as we have explained the
22 photointerpretation is done essentially by a group of
23 experts out of main office, pulp and paper companies
24 and the commercial contract, same trio.

25 In fact, I would like to emphasize that

1 the ground cruising and the photointerpretation
2 idealistically and usually is done by the same people
3 for the obvious reason that you go on the ground to
4 find out, had you looked at the ground in the photo,
5 and you bring that relationship back to him, translate
6 the rest in the photo. So it is really useful if the
7 person doing that translation on the ground brings it
8 back to the office.

9 So, similarly, in terms of Comment
10 column, in terms of photointerpretation, the Crown,
11 essentially on all Crown management units and, again,
12 most FMAs and company management units.

13 Different word in here 'most' which
14 didn't occur for here, because the skills and
15 expertise, particularly in photointerpretation --
16 particularly photointerpretation, which is where we are
17 when we are talking about photointerpretation. Some
18 companies do not have photointerpretation skill and
19 expertise, they may well have it in ground cruising,
20 but in photointerpretation, we have mentioned before
21 the need for a very specialized skill. In that case,
22 the Crown may well, interactively with the company,
23 provide that service.

24 Pulp and paper companies will do it on
25 their own FMA and licence, and the comment was rare as

1 most forest management agreement holders, which are
2 particularly the large companies, forest management
3 agreement holders typically are the largest companies
4 with a fair degree of staff, forestry staff, woodland
5 staff, so they would typically do photointerpretation
6 on their areas. But the licensee, the licensees can
7 range in size and some of them are distinctly smaller -
8 these could be saw log licensees or veneer mill
9 licensees - often smaller staff, they may not have a
10 forestry woodlands-type staff, and so they may not have
11 the skilled staff necessary to do photointerpretation
12 and, hence, the comment that it is rare for some
13 licensees to provide that service.

14 MR. FREIDIN: Q. So that item B then
15 refers to two different entities, the first one being--

16 A. The FMAs--

17 Q. --The FMAs.

18 A. --typically have their own expertise
19 because of the size of the company and the ability of
20 the woodland staff.

21 Q. Right. And the second line, licence
22 rare, it doesn't refer to FMA?

23 A. Again, it really varies from company
24 to company and within the companies they vary as to the
25 amount of forestry woodland staff and, within that

1 amount of forestry woodland staff, whether they have on
2 board one, none, zero, two people with
3 photointerpretation skills.

4 So in answer to your question, does the
5 word rare, the word rare applies to licence, the word
6 rare does not apply to FMA per se except the FMAs would
7 range in whether they do it or they don't it.

8 Q. All right.

9 A. Staying lastly with the end of
10 photointerp - commercial contract companies of which
11 there are very few, and they typically will do it on a
12 declared range of management units available. So this
13 group of people of whom are very few in Ontario are
14 available wherever their services are required across
15 all Crown land.

16 So we have gone through year one, year
17 two, we are down to year three which is the compilation
18 piece of the story, taking and producing of the maps
19 and data and reports.

20 And typically there are two sets of
21 people who do this compilation at this point in time,
22 but this is undergoing a change right now.

23 Typically compilation is done by Ministry
24 head office staff and under commercial contract. The
25 Ministry commercial -- the Ministry head office staff

1 who typically do it across all management units. So
2 out of main office my section is responsible for the
3 FRI across all units in terms of compilation.

4 And the commercial contract people may do
5 that for us, again, on all management units. If the
6 Ministry staff can't cope with the workload, we will
7 the contract this work out and we in fact will ask that
8 be done for certain management units.

9 Now, there is a change going on right now
10 in that with some of the forest management companies,
11 they are building up both expertise and capability and
12 numbers of people to handle some part of this
13 compilation. And, again, this is sort of dynamic,
14 changeable interaction managerially. Typically this is
15 what has been done to date.

16 So continuing with the same table, but
17 with the part of the table that's on page 238, and
18 there are two last functions left remaining. The
19 compilation was the taking of the data and moving the
20 numbers through whatever software was required to
21 produce the reports of which we have seen examples.

22 In the mapping sense, we have two mapping
23 functions: We have drafting - and even that word is
24 changing now - and the production of composites and the
25 composite map was our Exhibit 86. The word composite

1 is used in the connotation of a map, particularly on a
2 1:50,000 scale.

3 In the drafting function, again the two
4 -- the same two agencies that were used in compilation,
5 MNR staff and commercial contract with the same range
6 of comments re: covering the entire set of management
7 units.

8 Again, within the drafting, that function
9 is changing but some, particularly large, licencees are
10 developing and having some expertise and systems or
11 tools that will enable them to participate and do part
12 of this particular function too.

13 And the last to do with the mapping part
14 really, the production of the composite and the chrome
15 effects is merely the plastic sheet which reduces it,
16 and this is at the moment done entirely by the Ministry
17 staff covering all the management units.

18 So a sort of summary of what is doing
19 what, where and how and what some of the implications
20 are. The point to stress is that in the collection of
21 the data and in the interpretation of the data that
22 gives rise to the final reports and the maps, the
23 stress is that, where possible, let's get the people
24 who are actually going to use those data in the field,
25 in the licence, in the FMA, in the district -- let's

1 get the people involved with in doing -- using those
2 data involved in the process in the ground cruising and
3 the photointerpretation, wherever practical.

4 So an effort is made to decentralize that
5 collection of the data to those people who both need it
6 and are going to be held accountable as to what they do
7 with it.

8 And so the conclusion out of that, in a
9 way, is that the role of main office at this point in
10 time is the direction of standards through policies and
11 methodologies and processing of the data, because
12 historically it has been done by hand by a specialized
13 group of people.

14 This is the way the FRI has evolved in
15 Ontario. There has been a specialized main office
16 group of people historically since the process started.
17 and gradually, as technology changes, that expertise
18 will be decentralized to users. That process is
19 already starting. We have had two or three experiments
20 along this line. Some work, some don't work.

21 The general conclusion out of this
22 diagram is that these people are doing it now and this
23 is gradually changing over time to a greater and
24 greater involvement of the people who use and need the
25 data.

1 Now, in a way, this is the second half of
2 the recommendation, the second recommendation in the
3 Rosehart Report, which we quoted earlier, which goes on
4 to talk actually about the NRIS, but even from the FRI,
5 the forestry component of that larger natural resource
6 information service, the recommendation was the
7 decentralization to the field, the data collection,
8 storage and update.

9 The Ministry in fact has moved along
10 those lines and is continuing to move along those
11 lines.

12 MR. MARTEL: Does that mean that auditing
13 by an independent - whatever it is - body, somewhere
14 down the road is going to have to come into existence
15 to determine what in fact is going on as to -- because
16 if the Ministry staff isn't involved and it is being
17 done out there by someone, how do the public know that
18 what in fact is being done has been planned and called
19 for in the plans?

20 DR. OSBORN: Okay. The first question
21 you asked: Does it necessitate some external audit
22 agent down the road. My answer is no, it doesn't
23 necessitate that.

24 The way it is being done today at the
25 moment is that a set of standards, specifications and

1 methodologies is drawn up and being practised and
2 implemented and directed from the group, the main
3 office responsible for the FRI.

4 Already, as I have described, the actual
5 data collection is being done by people who are in the
6 districts, Crown people in the districts or the
7 licencees, licenced company people, are doing the work
8 but doing the work according to those specifications
9 and standards and methodologies and that work, in turn,
10 at the moment is audited and check cruised by the
11 people from head office.

12 This is no different whatsoever from the
13 way wood measurement is done in the province and has
14 been done for a long time, whereby the wood companies'
15 cut is scaled very often by the companies themselves,
16 the company's scales.

17 And that scale, that measurement of the
18 cut wood is check cruised by Ministry staff but, in
19 addition, the people who are allowed to scale Crown
20 wood have had to pass a test that they can prove and
21 demonstrate in fact they have the skills and
22 capabilities of keep following the process.

23 So as we decentralize the data collection
24 procedures, we have done the same sort of the thing.
25 The people who collect the data in the field and do the

1 photointerpretation in the field do it according to a
2 set of specifications and standards laid down and their
3 work is checked and audited.

4 As I continue, where your question was
5 going, as we possibly decentralize the entire process
6 in the data collection, manipulation and update, the
7 process would be decentralized in a fashion whereby
8 there still was audit, it still did follow
9 specifications, standards, methodologies laid down,
10 worked out, described by a group of people in main
11 office.

12 And the second recommendation of the
13 Rosehart Committee which describe the NRIS and how it
14 could function - and for this I am translating FRI and
15 how it could function - was that there be a main office
16 group of people who would specify the standards, the
17 methodologies, the policies and the techniques to
18 retain that compatibility: Let's make sure it is being
19 done right and it is all audited.

20 That same concept of having a group in
21 main office to set those standards and provide that
22 audit while the bulk of the work, collection, use,
23 manipulation and storage was done in this modern day
24 and age at a more remote location.

25 So as we move into the 20th century, the

1 technology to enable us to do that decentralized data
2 process, let's go that way because the people who want
3 the data are in the field, let them have the data -
4 which we have already provided them with right now -
5 let them have the data, and the tools and techniques
6 are keeping it up to date, but using procedures and
7 methodologies that are approved and directed to ensure
8 they are doing it right and compatible with everybody
9 else.

10 So if that explains where I think the FRI
11 in generally is going to gradually move from this
12 situation to become much more a user-oriented set of
13 data collection and presentation methodologies, but
14 still under an overall direction known, established,
15 audited, that is checkable, and following a set set of
16 procedures so that we don't have a particular area
17 being done one way - which happens in other provinces
18 in this country, for that matter - and it being done a
19 different way over here.

20 Within Ontario we have made a very
21 concerted effort and are fairly successful in having a
22 forest resources inventory procedure that is standard
23 from one end of the province to the other.

24 And you cannot not get that in BC and you
25 cannot get that in Quebec. Now, this province has made

1 a concerted effort to ensure that that process is
2 standard and additive.

3 MR. FREIDIN: Q. Where does the
4 preparation of stand maps fall on this list? Am I
5 correct that stand maps are prepared by the Ministry?

6 DR. OSBORN: A. Yes, that's where they
7 are done, at the moment they are done by the Ministry,
8 the compilation, which is the taking of the
9 interpretive photographs data and transferring onto the
10 base map. So we take the interpretive photo that we
11 have received and transfer that information onto a base
12 map to produce the forest stand map, is inherently a
13 part of compilation and then compilation staff take
14 those numbers off the map and produce the reports.

15 That's a half of your question. Perhaps
16 it is an unfortunate break in the diagram because the
17 second half of having got those data on the work
18 sheets, let's take the work sheet and draft a finished
19 Exhibit 85, forest stand map.

20 And right now it is done by hand, it is
21 done either by the commercial contract or in main
22 office. I sort of hinted that that technology is
23 changing, hand-drafting in fact is gradually being
24 replaced and I didn't intend to introduce this, but as
25 an illustration - which I will come back to, Mr.

1 Chairman, I will introduce the map later, an example of
2 a computer-produced map as opposed to hand-drafted map
3 is here and I will come back to this later.

4 But we have got the drafting process,
5 hand-drafting now being turned into computer-generated
6 maps.

7 THE CHAIRMAN: Mr. Freidin, I suppose if
8 he is referring to it in this context we should mark it
9 at this point.

10 MR. FREIDIN: I think so.

11 THE CHAIRMAN: It will be Exhibit No.
12 102.

13 MR. CASTRILLI: 101.

14 THE CHAIRMAN: I have a 101 which is the
15 acceptable error of plus or minus ten per cent.

16 Oh, sorry.

17 MR. FREIDIN: You are right.

18 DR. OSBORN: Yes, sir.

19 So to answer the question, what is the --

20 THE CHAIRMAN: Sorry, what is that called
21 from British Columbia?

22 DR. OSBORN: It is called a map sheet No.
23 175305460.

24 MR. FREIDIN: I will just add
25 computerized--

1 DR. OSBORN: Forest stand map.

2 MR. FREIDIN: --forest stand map.

3 ---EXHIBIT NO. 102: Computerized forest stand map.

4 DR. OSBORN: So to come back to the
5 question of is it main office that's producing the
6 maps. As inferred here MNR staff and commercial
7 contract produce the maps. Typically MNR staff in main
8 office, with some exceptions to this and, as I said,
9 this is gradually changing.

10 As the technology of producing maps
11 involves more and more computerization, that technology
12 in fact can be much more easily decentralized - and we
13 will speak more about this a little later - such that
14 the range of people participating in here may expand,
15 and it may involve MNR stand in districts and it may
16 ultimately involved MNR at -- it may ultimately involve
17 company staff.

18 This is in a state of flux but gradually
19 going in that direction as technology changes.

20 MR. FREIDIN: Q. Dr. Osborn, can you
21 tell me, are uses made of the forest resources
22 inventory for timber management purposes in addition to
23 the identification of stand composition which you have
24 already described?

25 DR. OSBORN: A. Yes, they are.

1 Q. And is that subject dealt with in the
2 witness statement?

3 A. On page 34. Page 34 of the witness
4 statement, paragraphs 64 to 66 and with reference to a
5 document on page 234 in the witness statement.

6 Q. That's document 34?

7 A. Document 34, yes. Document 34A on
8 page 234. There is a table on page 234 or a list on
9 page 234 that's entitled: Foresters' Uses of FRI.

10 Q. Could you provide then a brief
11 explanation of how the FRI is used for the matters
12 indicated?

13 A. Okay. As the list indicates, the FRI
14 provides a basic management unit statistics, it
15 provides an overall set of area estimates for the FRI
16 classifications, the FRI components of water,
17 non-forested, non-productive, productive forest land.
18 We went through the components yesterday. That sort of
19 set of statistics -- which is one of the reports in the
20 the FRI, that sort of set of statistics is used in
21 providing a basic description of the management unit.

22 In turn, part of the FRI data, as the
23 second point indicates, are used for the calculation of
24 the maximum allowable depletion which will be the basic
25 part of the discussion that comes out of this one

1 talking about yield, yield regulation. So the
2 calculation procedure to do yield regulation which is
3 called maximum allowable depletion, the data for that
4 in fact comes from the FRI.

5 Now, in addition, which is sort of a
6 follow-up to what the question was, the photographs,
7 the data, and the maps are also used for a range of
8 other forestry fuctions. As is evidenced if we look at
9 Exhibit 85, one can have some understanding of access
10 planning:

11 Where do I get to part of the forest for
12 whatever I wish to do; where do I go to do some
13 silviculture planning; where are my areas with no trees
14 and where I want to plant - that's barren and
15 scattered - where do I need to have some protection
16 practices as was mentioned earlier regarding spraying;
17 where do I go and cut - working group, site class,
18 age-class - and, again, the photographs, the maps and
19 the data can in fact be used to help with the licensing
20 allocation.

21 The second -- fourth sort of main point
22 in here, that the maps and the data - we are not
23 talking about photographs now so much - we the maps and
24 the data can be used for what it says here are economic
25 investment analyses and we have had earlier allusions

1 to this about productivity and whether it pays to put
2 your money in this site versus that site and Mr. Armson
3 yesterday spoke to the evaluations of productivity and
4 perhaps potential costs of re-establishment.

5 And what was behind that was: Where does
6 it really pay to invest your dollar. Those form of
7 analyses can and do use the maps and the data from the
8 FRI. Lastly in this list the maps themselves - and
9 here I am talking of the forest stand map particularly,
10 Exhibit 85 - the forest stand map as a recording device
11 is used for the recording of a whole range of actions.

12 Q. And the range of actions for which
13 maps are in fact used to record certain things, will
14 those maps be referred to by other panels?

15 A. Yes, when later panels describe what
16 these axis are, reference will be made to where and how
17 this particular Exhibit 85 kind of product comes into
18 play.

19 Q. Now, I understand, Dr. Osborn, that
20 the FRI is also used for land use planning and for fire
21 management purposes?

22 A. On page 235 is a chart or table
23 similar to the previous one entitled: Land Use
24 Planning Uses of FRI and this is not supposed be an
25 exhaustive list by any shape or form, it is an

1 illustrative list of the data of the FRI can be used
2 and is used by land use planners to provide the basic
3 forest cover statistics as a part of the total land use
4 planning exercise, provides data for future projections
5 as regards the wood - and I think that evidence was
6 described in the strategic land use planning guidelines
7 in Panel 1 - the maps and the data give an indication
8 of wildlife habitat - and just let me add sort of an
9 example.

10 In the Algonquin area, the southern area
11 of the area of the undertaking the hemlock stands and
12 hemlock is a species and a working group that may well
13 exist and the hemlock species will exist in stand
14 composition in the Algonquin region. Those hemlock
15 stands may well become winter yards for deer. So the
16 identification of where those hemlock stands are as
17 winter deer yards is a proxy indicator that wildlife
18 can and do use.

19 The wildlife people also will use the
20 maps and the data of the FRI to see and determine the
21 amount of edge: Where have we a cut area or a growth
22 area, i.e., little vegetative cover, low vegetative
23 cover versus a immature or mature stand.

24 Now, that edge in a way is demonstrated
25 on the forest stand map, you can see where are the

1 barren and scattered, the 1-20s and where are the
2 mature stands. The boundary of that low-lying
3 vegetation to the mature vegetation, that edge effect
4 apparently, I understand, is of importance in wildlife
5 management. Again, the FRI provides an indication of
6 that sort of effect. Where is it, is it continuous,
7 discontinuous.

8 And lastly, the maps and photographs may
9 be an aid - and I understand in districts can be an
10 aid, in the items like cottage lot planning, park
11 proposals and certainly in terms of hydro line
12 proposals. For example, the FRI in fact is used by
13 Ontario Hydro to help in site selection, they take our
14 data, in essence they use it in site -- in transmission
15 line planning.

16 Page 236 provides a table that answers
17 the second half of the question to do with fire
18 management. And, again, for the fire people it
19 provides some basic forest cover statistics because it
20 is known of the different susceptibilities by age or
21 species as to rate of travel of the fire once it
22 strikes.

23 So the cover type maps and the cover type
24 maps means a forest stand mapman showing the kinds of
25 tree cover encompass - what a cover type map is is a

1 forest stand map - can be an aid in fact in the
2 modeling of fire behaviour. So people doing research
3 in fire can take the forest resource inventory data
4 into a computer and knowing where the different forest
5 stands are can start to model: If the fire starts here
6 in this jack pine mature stand and the wind is blowing
7 from this direction, will the rate of spread be fast or
8 slow because of the nature of the cover.

9 And, literally, the data are used for
10 that kind of modeling behaviour, which helps fire
11 fighting in terms of guidelines: What do we do here
12 and under these circumstances.

13 Similarly, they use it as a proxy for
14 fuel mapping which is quite an important concern. They
15 act obviously as a record of where a burn is taking
16 place, which is a necessity to help the FRI keep itself
17 up to date. And, similarly, they are used to help with
18 impact studies.

19 Q. Dr. Osborn, you indicated in your
20 earlier evidence that the forest resources inventory is
21 prepared for each management approximately or, on
22 average, once every 20 years.

23 Can you advise, is there any mechanism by
24 which the information provided by the FRI can be
25 updated within that 20-year period before you actually

1 go out and re-inventory the area under the forest
2 resources inventory?

3 A. Yes, this is spoken to within the
4 evidence package on page 34, it's spoken to in
5 paragraphs 67 and 68, particularly, and the
6 implications of this process are spoken to at paragraph
7 69.

8 And what is stated in 68, particularly,
9 is there is a variety of procedures available to the
10 manager to keep their data up to date. In this case,
11 we are talking of keeping the FRI data up to date and
12 paragraph 68 goes on to describe the sorts of sources
13 of those data, what is needed, and where does it come
14 from to enable the data to be kept up to date.

15 Q. And I understand that the actual
16 requirements for the up-dating within this 20-year
17 interval will be dealt with by another panel?

18 A. That is correct.

19 Q. Dr. Osborn, can you tell me whether
20 you were involved in the Rosehart Report in any way?

21 A. I wasn't on the Rosehart Committee.
22 I was asked to be a resource person for the Rosehart
23 Committee which, as I understood it, was to help them
24 wherever I could.

25 In that capacity for the first, I believe

1 three meetings of the Rosehart Committee itself, I was
2 asked by Dr. Rosehart to attend those meetings and
3 during the course of those three meetings I was asked
4 at some length by the committee members to describe
5 what was Ontario's FRI and, in fact, I was asked
6 essentially to do that which I have done over the last
7 two days which was describe the FRI, how it was done,
8 why it is done, where it is done, the whole FRI
9 process.

10 Now, in addition to that, I did one other
11 thing partly because of the composition and background
12 of the committee.. I was asked to put on a
13 demonstration for one particular afternoon within the
14 forest resources inventory section in main office, a
15 demonstration of literally what were the processes
16 involved, what were aerial photographs, how were they
17 used, how were they checked, how were they
18 photointerpreted, how was ground cruising done, how was
19 the transfer of the photograph to the map done, the
20 whole practice was demonstrated as a sort of walking
21 tour for that set of -- that committee.

22 And the composition of the committee was
23 such that at least four of the members were not
24 familiar with the process of FRI at all, two of them
25 were foresters and had background in what the FRI was -

1 although not necessarily use it - so in those first
2 three meetings there was considerable input in
3 describing to that committee what was the process
4 about, the mechanics of it, the technologies of it,
5 including demonstration.

6 Q. Now, in the witness statement, Dr.
7 Osborn, there is a section called FRI Futures which
8 starts on page 35 and perhaps you could just advise us
9 generally what this section is about and why have you
10 chosen to deal with these FRI Futures in the evidence?

11 A. The section was contained as a sort
12 of culmination of the whole FRI process in the evidence
13 for two major reasons. The first major reason was to
14 sort of exemplify that the FRI process is dynamic,
15 dynamic in the sense of: What was the original process
16 back in the 40s has changed through the 50s and the 60s
17 as user requirements have changed and technology has
18 permitted us to change, the whole FRI process is a
19 living entity and not a given fixed way of doing
20 business. And so this list of items was certain
21 indications of where that was happening.

22 The second main reason was to give some
23 flavor from, if you like, an expert point of view, what
24 were the areas that were recommended and being gone
25 into using tomorrow's technology right now. Which

1 areas were we trying to take the FRI to, through time,
2 what were the areas we were second-guessing as to where
3 we should improve and how we should do it. So there
4 were two reasons why this data, this set of paragraphs
5 from 70 to 84 were included.

6 Q. And am I correct, Dr. Osborn, that
7 you have in effect split up the section on FRI Futures
8 into two parts; that the first part appears in
9 paragraph 71 to 76 and in fact will deal with a review
10 and testing of technologies which might improve the
11 accuracy or precision of the FRI, and that the second
12 section begins at paragraph 77 and runs through to
13 paragraph 84, and that part deals with the development
14 of techniques designed to enhance the ability of users
15 of the FRI to obtain the FRI information and to obtain
16 it in a more usable form?

17 A. That is correct.

18 Q. Now, could you first then deal with
19 the FRI Futures in relation to the first category?

20 A. Yes. And before I do that, I would
21 like to sort of, in lay terms, what did that mean? The
22 first set of recommendations deal with: How do we get
23 it; the second set of descriptions deal with: How do
24 we process it.

25 So in a nutshell, the first set I am

1 talking about now really are techniques dealing with:
2 How do we collect the data in the first place.

3 And in paragraph 72 and 73 there was a
4 description of experiments that were proposed and in
5 fact there are some on-going of the use of remote
6 imagery to both serve as the input for the FRI in the
7 first place, instead of aerial photography, which is a
8 remote imagery format in terms of either satellite
9 imagery or now more specialized aircraft-borne imagery,
10 how could we use that technology and that imagery to
11 capture the data in the first place, the equivalent to
12 the photograph.

13 And, in fact, there is an on-going
14 contract with a research and development firm just
15 outside Toronto to use and to test the use of some
16 imagery that is called MEIS, which is M-E-I-S, capital
17 MEIS, which is a very new form of imagery to see
18 whether that can enable us to produce, if you like, a
19 forest stand map right the way through from data
20 capture from an imagine, some human interaction to a
21 map sheet, almost completely within a computer
22 environment.

23 So the first half of the use of remote
24 imagery deals with: Can we capture the data, walk it
25 all the way through to produce a forest stand map brand

1 new.

2 The second comment spoken to in paragraph
3 73 and there is an experiment going on right now, a
4 contract going on right now with the Ontario Centre for
5 Remote Sensing is: How can we use imagery, in this
6 case satellite imagery, for taking existing FRI and
7 updating it because of cuts or burns or roads.

8 We have already got a representation of
9 what was out there when the inventory was done.
10 Exhibit 85 is a map showing the inventory as given in
11 that unit, I think, in 1984.

12 What can we do with modern technology,
13 particularly, imagery now to enable us to find: Where
14 was it cut, where was it burnt, where are the new roads
15 going in. The satellite imagery provides that
16 capability to test just to make it in a practical form
17 and format.

18 Q. Dr. Osborn, were either of those two
19 matters dealt with or referred to in the Rosehart
20 report?

21 A. Yes. Within the Rosehart Report
22 Recommendations 9 and 10 dealt with the need or the
23 recommendation to incorporate and use imagery data.

24 Q. Perhaps you could refer the Board to
25 the Recommendation 9 and 10 and we were referring to

1 page 19 the last time which was the list of
2 recommendations.

3 A. That is correct.

4 So on page 19 of Exhibit 93,
5 Recommendation 9 reads that:

6 "The Ministry of Natural Resources and
7 the Ontario Government encourage research
8 into applications of modern remote
9 sensing technology to map resources
10 inventory systems."

11 And 10 that:

12 "The Ministry of Natural Resources
13 explores with the private sector
14 inventory companies ways in which they
15 can bring their expertise to the forest
16 inventory process."

17 This contract to do with MEIS imagery is
18 actually with two private companies in the Toronto area
19 with some knowledge in both imagery and the use of
20 those data for forest inventory. Essentially the
21 example I gave you of this on-going contract and has
22 been for up to 18 months. That contract is an
23 exemplification of those two recommendations.

24 Q. Recommendation 9 indicates that the
25 Ministry explore with the private sector inventory

1 companies ways in which they can bring their
2 expertise -- am sorry Recommendation 9: that the
3 Ministry encourage research into applications of modern
4 remote sensing technology to natural resource inventory
5 systems.

6 Is the experimentation and the research
7 being done in relation to remote imagery directed to
8 natural resource inventory systems as it was described
9 by Dr. Rosehart, or is it being directed towards the
10 forest resource inventory you described?

11 A. The work I described as being put
12 forward and described is in regards to the FRI, the
13 forest resource inventory system.

14 Q. Can you deal then with Item B then,
15 the infrared photography?

16 A. Paragraph 74. The recommendation was
17 made that the Ministry continue to -- sorry, paragraph
18 74 of the evidence indicates that we in essence have
19 been doing work with different forms of photography,
20 different forms of film and cameras to try and improve
21 both the precision of, usefulness of, and the
22 administrative completion of inventory of the aerial
23 photography to ensure that it is done on time and is in
24 more useful than even the current procedure.

25 So for the last two or three years we

1 have had series of experiments using infrared
2 photography and infrared has an advantage that it can
3 cut through haze, and again in describing the aerial
4 photography contracts, reference was made in the timing
5 as to the start and finish of the season and the
6 operational difficulty of haze and infrared can cut
7 through that. That means that there is a greater
8 chance of the contract being done to spec on time.

9 Now, the problem associated with that in
10 testing that over the last three years is, yes, that is
11 true, but that comes at a considerable price. In
12 dollars and cents it is two to three times as expensive
13 as the current way of doing business, but there is a
14 pragmatic problem here.

15 At this point in time in the country
16 there is only one processing facility for infrared film
17 and that processing facility is primarily - which is in
18 the Federal Government - is gradually being phased out
19 of existence. The second -- and so to process that
20 film maybe in the future they have to sent it to the
21 United States. Now, that in itself is not a problem,
22 but there is the inherent difficulty of one rather
23 expensive set of film being sent to the U.S. and coming
24 back again.

25 Under the current procedure, it is

1 handled by the existing aerial contract people and they
2 have their own darkroom and processing facilities to
3 handle this relatively easy and are familiar with the
4 pancromatic film that is currently used.

5 The second problem really associated with
6 the infrared is the expertise required to handle it and
7 process it. The film needs to be very carefully
8 stored. In fact, in a very pragmatic sense, you have
9 to keep it cold in the freezer before you take it out.
10 So you take it out of the freezer, you fly, you put it
11 back in the freezer if you don't use the hole roll up.
12 It is much more difficult to handle. So we have got
13 some pros and cons in the deal.

14 What we found in the meantime is aquafilm
15 in fact has the ability to penetrate haze and so for
16 the same cost as using Kodak film we can get through the
17 haze and use another process.

18 All this exemplifies is this sort of
19 research goes on, it doesn't always come out with the
20 answer you would like it to. You go up a few blind
21 allies and infrared may pay in the long run, so it has
22 not been dismissed it's: Let's keep it on the books.

23 Paragraph 75, still dealing with data
24 capture, speaks to the use of large scale photography.
25 This is almost the other extreme. When we talked of

1 the aerial photography of the FRI we talked of the
2 scale of 1:15,840 - 20 chains to the inch. A larger
3 scale is something in the order of 1:1,000 and 1:500.
4 When you photograph the larger scale the things look
5 bigger. It is the way I try and remember it.

6 So if we have got a lower flying aircraft
7 or a lower flying helicopter, a smaller piece of the
8 ground being looked, at the products, the trees on the
9 ground inherently on the photograph look sufficiently
10 big that you can actually see the individual trees on a
11 large-scale photograph.

12 When I showed you the aerial photograph
13 from the FRI you could see the general types of forest
14 stand but the individual trees were not easily
15 distinguishable. Large-scale photography you can
16 actually see and measure the individual trees.

17 MR. MARTEL: Well, would that not be much
18 more advantageous, if you not only see the trees, you
19 would see everything else that's there and would it not
20 be more advantageous in planning to have that sort of
21 photography as opposed to that which is much smaller
22 and harder to interpret?

23 DR. OSBORN: Yes, with the comment, Mr.
24 Martel, that you will end up with an incredibly much
25 larger set of photographs and - I sound like a broken

1 record - but I am back to, as a result, you have got a
2 much better cost for the same total coverage.

3 MR. MARTEL: You wouldn't get more out of
4 it, you don't think?

5 DR. OSBORN: Yes, I do think. In fact
6 within my feeling and the reason I am going in this
7 direction, the reason the technology is going in this
8 direction, I do personally think that has some real
9 potential to provide some more refined volumetric
10 estimates particularly in the FRI.

11 So the reason we are pursuing doing
12 large-scale photography at all is because I do think
13 that there is a chance of improving the way we estimate
14 certain parts of the FRI when we use this type of
15 photography.

16 So we have had an experiment that took
17 place two years ago in one management unit and the
18 results were encouraging, encouraging in the sense we
19 didn't just drop, we produced this as an experiment.
20 We are doing that process again this particular year
21 where the new inventory is and the idea is to check and
22 evaluate what do we get out of this versus the
23 conventional way of doing it.

24 So very much in line of your suggestion.
25 This is being pursued because we think this has a

1 potential for improving the FRI.

2 MR. FREIDIN: What time are we going to
3 break, Mr. Chairman?

4 THE CHAIRMAN: I think, Mr. Freidin, if
5 you take this witness to the end of 77, if that is a
6 convenient spot to break--

7 MR. FREIDIN: Okay.

8 THE CHAIRMAN: --between the topics, and
9 you might as well finish off this whole section.

10 DR. OSBORN: Just before we leave
11 large-scale photography, much has been - as well as
12 asked before, this particular subject was also
13 recognized actually by the Rosehart Committee as an
14 area in which there was some potential and the
15 recommendation, in this case, No. 15 on page 19 of
16 Exhibit 93.

17 Recommendation 15 on page 19 reads:

18 "The Ministry of Natural Resources
19 proceed with the pilot survey using
20 large-scale photography technology and
21 proceed as soon as possible to make a
22 decision about its operational
23 suitability."

24 And one of the reasons, as I mentioned,
25 that I think this particular piece of technology has a

1 future really is spoken to again in the Rosehart
2 Committee in Recommendation 13.

3 On page 19, that Recommendation 13 reads:

4 "The Ministry of Natural Resources
5 conduct an evaluation of how best to
6 estimate volume and implement the
7 findings of such a study to
8 produce more reliable volume estimation
9 estimate techniques."

10 Now, this large-scale photography offers
11 some possibilities in a variety of ways.

12 MR. FREIDIN: Q. So I assume we go from
13 large-scale photography to mini-prints?

14 DR. OSBORN: A. Well, we are going in
15 the right scale, we've gone from 15,840 down to a
16 larger scale, smaller area, and mini-prints actually
17 physically are small.

18 Paragraph 76 is really a piece of
19 operational procedure. When the aerial photograph
20 contract is let, we described it's let and it tends to
21 start in typically as early in the summer as the leaves
22 flush and try and end by the fall.

23 In that time horizon, it is essential
24 that that contract that year we end up with complete
25 coverage, we don't want any gaps, we don't want the

1 photography not to cover the entire area because it
2 sets the whole FRI process back a year, we have got a
3 gap in the data right at the beginning of the process.

4 The aerial photo contractors take the
5 photographs, they have got to process them, they have
6 got to print them, they have then got to send them back
7 to us and the printing of photographs at 9 x 9 -- or 9
8 inches by 9 inches, which was the size of document that
9 you had - is quite expensive in printing.

10 So what the contractors do, in the course
11 of the contract they will send back parts of the
12 negatives and we will run them through a machine we
13 just had custom-built to produce literally a
14 mini-print. The prints are two and a half inches
15 square. We can produce them a lot cheaper and what in
16 essence we do is, we produce those mini-prints and we
17 literally cut them and lay them down to cover the
18 entire contract area.

19 So we have a large sheet with the
20 original map area on it and we will lay those
21 mini-prints down and they are now two and a half inch
22 square, so we have a row, after row of laid-down
23 overlapping mini-prints - there is a 60 per cent
24 overlap east to west and a 25 per cent overlap north
25 and south.

1 So you have got this mass of rows of
2 little prints which very quickly do two things: first
3 of all you can very quickly see: Do I have any holes
4 or any gaps when I flue, which is one of the reasons
5 for this. And the second is that you can look at those
6 mini-prints and a photointerpreter - and you have
7 somebody on this as a quality control function -
8 photointerpreter can asses quite quickly from the
9 mini-print: Is it suitable for photointerpretation.

10 Now, let me give you a very practical
11 example this year. This year the defoliation that took
12 place in the hardwoods in the Algonquin region was
13 serious, trees were completely stripped bare.

14 So the aerial photography starts and the
15 real was question was: Had we caught the trees in that
16 first flush before the insects got at them. And rather
17 than rely on what the pilot thought when he leaned out
18 of the window; negatives get sent back, the mini-prints
19 get laid, the photointerpretation person can quicky
20 assess: Are there enough leaves on the trees or do I
21 have to tell the contractor to re-fly when the second
22 flush of leaves come out.

23 So during the course of the operation to
24 prevent gaps and unuseable photography too late at the
25 end of the contract, the photographer - when the aerial

1 contractor has let the area, that operational quality
2 control is done using mini-prints.

3 MR. FREIDIN: That's a good place to end.

4 THE CHAIRMAN: Okay.

5 Ladies and gentlemen, we will adjourn at
6 this point until next Monday at the regular
7 commencement time of 1:00 p.m.

8 I just want to check. Have the parties
9 who are going to be making those submissions to the
10 Board regarding the site visit done so at this point?

11 MR. TUER: Yes, Mr. Chairman.

12 MR. FREIDIN: We will deliver our things
13 to your office momentarily. I think extra copies were
14 being run off or have been run off.

15 THE CHAIRMAN: So we will be able to take
16 the package with us when we leave this afternoon, Mr.
17 Freidin?

18 MR. FREIDIN: Yes.

19 THE CHAIRMAN: Very good. We will try
20 and give, at least to MNR - if we have not got it in
21 shape in terms of the whole outline of the site visit -
22 at least produce to MNR on Monday some time some of the
23 things we want to see so you can start with your own
24 planning.

25 MR. FREIDIN: We can deal with that at

1 the very beginning of the hearing.

2 THE CHAIRMAN: Right. And what we are
3 proposing to do, by the way, is: We are going to try
4 and assess the types of activities that we would like
5 to see, some of the locations of those activities
6 specifically that we would like to see, and then ask
7 the Ministry to put together the appropriate plan of
8 how we visit all those.

9 In other words, we are not going to try
10 and set up what order or where we should fly first or
11 second, or how it should be handled on the ground. We
12 are going to leave it all to you because you will have
13 to consult with the people who are going to do the
14 flying and all that kind of thing.

15 MR. FREIDIN: That's right. If it turns
16 out with the selected sites or things, if it appears
17 impossible to get the distance or logistics to go to
18 one or two sites, then we can come back and we will
19 advise you.

20 THE CHAIRMAN: That is right. And the
21 other thing is that we have no idea in terms of the
22 time frame it may take to do that in actual fact.

23 So we will give you a list of things and,
24 presumably, we will probably be giving you more than
25 you can cover in the week.

1 In the event that we give you less, we
2 would like to utilize a reasonable amount of hours
3 during that site visit to see as much as possible. In
4 other words, if we do not want to knock off for an
5 afternoon because we just have not put in enough sites,
6 we want to utilize that time effectively since it is
7 not going to be used, in essence, as hearing time.

8 MR. FREIDIN: Very well.

9 THE CHAIRMAN: And we are planning, I
10 think, to look at the Monday through the Thursday,
11 keeping roughly the same schedule as a hearing week.

12 Is that what you have in mind?

13 MR. FREIDIN: Yes. Mr. Kennedy advises
14 me that that was the basis upon which our
15 recommendations are being made.

16 THE CHAIRMAN: Okay. And the one last
17 thing to keep in mind is that in the event that weather
18 is a problem, and we cannot get into the air, we would
19 like you to come up with as many alternative
20 on-the-ground activities that we can take part in, so
21 again to utilize the time effectively.

22 MR. FREIDIN: Mr. Kennedy advises me that
23 that has already been done.

24 THE CHAIRMAN: Okay.

25 Thanks very much. Have a good weekend.

1 ---Whereupon the hearing adjourned at 2:05 p.m., to
2 reconvene on Monday, July 6th, 1988, commencing at
3 1:00 p.m.

4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25 (Copyright, 1985)

